

Furniture & cabinetmaking

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Extract from
*Chairmaker's
Notebook*



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ebonising



Takenaka museum:
The ultimate
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3-way mitres
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Welcome to...

The Rubik's Cube of cabinetmaking

PHOTOGRAPH BY GMC/DEREK JONES



Chairmaking: that complex jumble of components with fiddly little joints never fails to put the wind up the average furniture maker or restorer. Rightly so perhaps, as their form requires us to think and operate in a far more fluid way than when we're building case furniture. The full range of rectilinear joinery will allow you to build pieces with predictable structural integrity, thanks to the range of joints based around a mortise and tenon. So predictable in fact that it's easy to master a few set pieces and not really progress any further. Especially when square or 90° fixes most things. Transfer this knowledge directly to an abstract form like a chair and you may as well throw away the rule book as you know it.

Most of the things we make have a definite front elevation: one that helps us navigate our way round the object. It will be the dominant image in our mind as well as the one on the page. We reference from it continuously for measurements and alignment. Tackling chair design for the first time however, is like Tyson stepping into the ring and being confronted by a Rubik's Cube.

Reverse engineering

The forces may be with you forwards, backwards and sideways on a cabinet build,

but chairs will come at you from every direction. Some structures, take this one, for example, are designed with definite suicidal tendencies, doomed to self-destruct through normal use. Admittedly, the joints are designed for ease of manufacture and not for duration. Usefulness and longevity have been compromised to achieve a look, which is never a good idea.

Pieces like this are a great way to learn what does and doesn't work and where the weak spots are on a generic design. To fast track your three-dimensional vocabulary, try some reverse engineering on someone else's mistakes before you make any of your own.

You can pick up a wide variety of chairs for a song at auction that can be either modified, mixed up completely or subtly tweaked to overcome a number of complex design issues. Drawings and measurements on the other hand are never as accurate or as much fun to play around with as a life size working model.

CNC knowledge

At the other end of the scale this month, we're going to be looking at a completely different set of skills as we follow Gordon Fry's transition from hardcore hand tool woodworker to state-of-the-art CNC machinist. If you're already using CAD to realise your designs, then you're closer to this mindset than you think. There was a time when getting a CNC to do what you wanted required at least basic knowledge of programming and an ability to track an object as a series of coordinates. Anyone starting their computer aided design education with something as basic as SketchUp will have leapt straight into the virtual world of three dimensions and therefore the language of modern CAD/CAM systems.

I know, it doesn't matter how I dress it up, it still sounds a little dirty and far removed from the craft-based skills we know and love, but resistance and, dare I say, ignorance, is futile. The more machines like these that come into the hands of traditional woodworkers, i.e. those adept at working with hand tools, the better.

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Furniture & cabinetmaking

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Woodworking is an inherently dangerous
pursuit. Readers should not attempt the
procedures described herein without
seeking training and information on the
safe use of tools and machines, and all readers should
observe current safety legislation.

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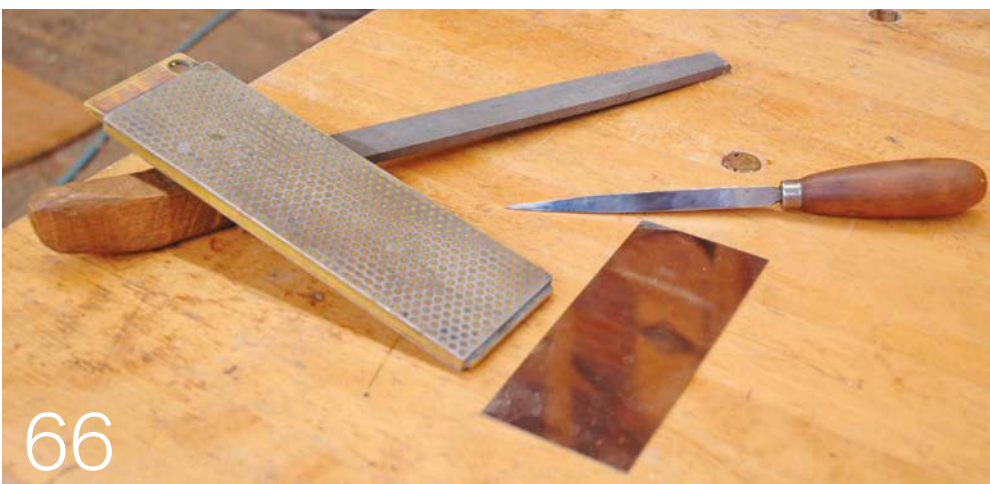
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Contribute to these pages by telling us about matters of interest to furniture makers. Call Tegan Foley on 01273 402 839 or email teganf@thegmcgroup.com. Please accompany information with relevant, hi-res images wherever it is possible

News & Events

Global support for Heroes' wood workshop



One of the members practising woodcarving



Inside the fully-equipped wood workshop

PHOTOGRAPHS COURTESY OF HELP FOR HEROES

A wood workshop, funded and kitted out by donations from woodworkers all over the world, has been officially opened at Help for Heroes northern Recovery Centre. Wounded, injured and sick servicemen, women and veterans being supported at Phoenix House in Catterick, have benefited hugely from participating in weekly woodcraft sessions, with a wide range of machinery, tools and wood where they can practise the craft as therapy, to learn a new skill, or even as the first steps into a new career as part of Help for Heroes Career Recovery Pathway.

Driven by Warrant Officer and Phoenix House volunteer, Chris Morgan, who heads a group called the Woodwork Volunteers, the

campaign has resulted in donations of money, equipment, tools and wood pouring in from the woodworking fraternity around the world. The campaign's fundraising target was originally £30,000 but it soon became clear that such an amount was not needed, thanks to donations of equipment from manufacturers and tools and wood given by retired woodworkers or by the relatives of those who have died. The appeal was launched by toolmaker Robert Sorby at the 2013 North of England Woodworking and Power Tool Show, which was prompted by the success of a series of woodturning workshops held by the company for Help for Heroes beneficiaries.

The interest generated by those classes inspired the development

of woodworking as part of the curriculum in the recovery process and Chris Morgan has been running regular carving sessions at Phoenix House. The new workshop facilities will enable users to expand their woodcraft skills to include woodturning, fretwork, image-burning and produce carvings and shapes to any design, thanks to a state-of-the-art CNC machine. Many of the machines are adapted for wheelchair users.

The workshop was officially opened by Col John Bridgeman, Master of the Worshipful Company of Turners and Chairman of the Recovery Careers Services, and professional woodturner and teacher, Tony Wilson.

To find out more information, see www.helpforheroes.org.uk.

DEWALT announces winner of 5Ah draw

To celebrate the launch of its new XR Li-Ion 5Ah battery, DEWALT hosted a series of events at stockists across the UK and Ireland offering customers the first opportunity to try and purchase tools from its new range. Customers who bought 5Ah products on the day were entered into a draw to win the top prize of a Vauxhall Vivaro van worth over £15,000. The winner has been announced as Jason Weldon, an independent

carpenter and joiner from Chessington, Surrey.

Jason said: "I'm thrilled to have won the top prize. Running out of power during an important job is always frustrating. This new technology means that I'll no longer have to focus on how much power I have left and can concentrate on the job in hand."

For more great competitions and to find out the latest news, visit www.dewalt.co.uk.



Winner Jason Weldon

PHOTOGRAPH COURTESY OF DEWALT

Fun playtimes ahead for Royal brother and sister



Furniture designer Stuart Padwick

The Furniture Makers' Company recently joined the world in celebrating the arrival of Princess Charlotte Elizabeth Diana and are pleased to announce that TRH The Duke and Duchess of Cambridge have said that they will be delighted to receive a nursery table and chairs as a gift from the Company, to celebrate the birth of the new Princess.

The gift will come with all good wishes for the future health, happiness and long life of the Princess from the entire UK furnishing industry.

In February 2014, the Company presented

HRH The Duchess of Cambridge with a specially commissioned high chair made by Katie Walker for use by Prince George – 'A Chair Fit For a King' – and they wanted to find an appropriate gift for the new baby. The Company organised a competition to find a designer for the nursery table and chairs. There were over 20 entries from holders of the prestigious Bespoke and Design Guild Marks, which produced a shortlist of five designers: Matthew Burt, Samuel Chan, Alex Hellum, Stuart Padwick and Katie Walker.

After presenting their design concepts to the judges at Furniture Makers' Hall, Stuart Padwick, holder of several Design Guild Marks, was unanimously chosen as the winner.

The table and chairs will be exhibited by the Company at its Third Royal Charter Dinner on Tuesday 28 October, 2015 and will be delivered at a later date to Their Royal Highnesses. For more information, see www.furnituremakers.org.uk and www.stuartpadwick.co.uk.

Dovetailors make new choir stalls for Wakefield Cathedral

Dovetailors has been commissioned to build new choir stalls for Wakefield Cathedral following its successful project to design a new altar and ambo as part of a major refurbishment of the historic West Yorkshire place of worship.

During the design and manufacturing process, the Dovetailors team has extended an open invitation to members of the church community to visit its workshop in Leeds to see the project progress.

Creative director David Wilson said: "We have thoroughly enjoyed our collaborative role with the cathedral community over the past couple of years and are very proud to be working with them again on this latest commission. As with our original work in

designing the altar and ambo, we are extremely sensitive to the fact that these choir stalls will have a solemn purpose and will serve the community for many generations to come. They will reflect the same character and warmth as the other pieces we have made for the cathedral and will be an intrinsic part of the building's personality and future heritage."

Due to their size, the finished choir stalls have been hand finished and oiled in the Dovetailors showroom, giving visitors to the shop a chance to see the firm's latest ecclesiastical furniture design project take shape. For further information, see www.dovetailors.co.uk.



Dovetailors' choir stalls for Wakefield Cathedral

TIMBER TRADE NEWS Green spruce aphid



The green spruce aphid (*Elatobium abietinum*)

The green spruce aphid (*Elatobium abietinum*) is native to Europe and causes damage to the needles of many species of spruce (*Picea spp.*) grown in the UK. These include *P. abies*, the Christmas tree, *P. sitchensis* – an important commercial timber tree – and other North American species. *P. breweriana* and some Asiatic species are resistant. The aphids suck the sap from needles, causing them to go yellow, then brown. The effect is similar to frost damage. This damage is particularly serious in drier parts of the country, where the trees may be under water stress. The aphids secrete a sweet substance called honeydew, which encourages the growth of sooty moulds. The combination of needle damage and mould can make Christmas trees unsaleable, causing serious financial loss. The aphids are small – 1.5mm long – and have red eyes. They are parthenogenetic; in other words, the young are born alive without the females mating and laying eggs, and males are very rare. They are wingless for most of the year, but winged females appear in spring and early summer and disperse the species to new host plants. Control is achieved by insecticide spraying and is essential in Christmas trees.

Chris Prior



The green spruce aphid causes damage to many species of spruce



Collaptes wooden furniture

Cyntia Briano Alamillo, of Mexico City-based Collaptes, handcrafts these wooden furniture pieces. The designs use as little hardware or chemical solvents as possible, instead focusing on the raw material. Cyntia focuses on making environmentally friendly furniture to reduce waste and uses as much of the wooden boards as possible. Many of their pieces are made up of wooden components that fit together like a puzzle and

therefore require no fasteners. The 'Macadamia Chair', shown here, is made from six pieces of cut wood that fit and stay together by the weight of the person sitting in it.

Other pieces include the 'Piccolin Table', the 'Briano Chair', which helps you maintain an ergonomic posture while sitting in it and the 'Lava Stool', which is supplied as six pieces, which the user can easily fit together. To find out more, see www.collaptes.com.

PHOTOGRAPH COURTESY OF REFORMNEWS.COM

The 'Macadamia Chair' is made up of six pieces, which all fit together like a puzzle



Branching & looping wooden tables

Sculptural furniture maker Michael Beitz is known for his entangled and wavy tables and some of his new designs include a 15m long picnic table entitled 'Tree Picnic', which branches like a tree and another 8.5m-long tangle of looping wood titled 'Not Now', which is pictured opposite. The name of this piece refers to the table's anti-social design and is effectively a sculpture of a wooden table tangled in a giant knot. To see more of his work, visit www.michaelbeitz.com.

PHOTOGRAPH COURTESY OF WWW.DESIGNFATHER.COM



'Not Now' by Michael Beitz

Summer craft & design shows

The Chilterns Craft & Design Show returns to Stonor Park near Henley-on-Thames from 28–31 August followed by the Weald of Kent Craft & Design Show at Penshurst Place, near Tonbridge from 11–13 September, 2015.

Both shows will feature a host of exquisite and fine British crafts. It's a chance to discover beautiful pieces for the home including furniture and glassware as well as jewellery, luxury beauty products and leather goods. As well as browsing the crafts marquees, visitors can take part in demonstrations, workshops and relax in the beautiful grounds of the house and gardens.

There is plenty of fun for all of the family with a wide range of activities for children as well as the Graduate Marquee by Informed Design, which brings a range of stunning work from newly qualified designers. This is a unique opportunity to snap up exquisite pieces from the next 'big names' in the industry. Visitors are invited to browse work made with the utmost care to the highest quality that is inspired by innovative design. There will also be a host of specialist food and drink marquees, the Café Eatons Bar, plus much more. To buy tickets, call 01425 277 988 or visit www.ichfevents.co.uk.



PHOTOGRAPH COURTESY OF ONEYOUNG MEDIA

Get crafty at these two summer events

Peter Sefton's Annual Open Day

July sees the Peter Sefton Furniture School hosting its famous Annual Open Day, which this year takes place on 18 July. Come along to the Threshing Barn, the home of Peter's school in Worcester, and meet the expert tutors, see professional demonstrations and pick up advice, tools and products along with a stunning exhibition of pieces of furniture designed and made on the Professional Long course, at the students' End of Year Show.

This year, there is plenty to do and see,

including Peter's ever popular hand skills tutorials, which give visitors a flavour of the sort of skills they can learn on the professional long course and short courses at the School, as well as a demonstration of WoodRiver planes.

You can also expect to see demonstrations from Bob Jones, the two-day French polishing course tutor who will also be selling finishing products from AG Woodcare; router tutor Chris Yates will also be in attendance; woodturning tutor Chris

Eagles will be demonstrating with newly launched tools from Easy Wood Tools and Sean Feeney, the designer-maker in residence will be showcasing his new 'Panga' table. As well as all this, Peter's very own tool shop, Woodworker's Workshop will be open for business. This year the School is supporting the Help for Heroes charity who will be collecting any unused or old hand tools that will be auctioned by David Stanley Auctions. To find out more, see www.peterseftonfurnitureschool.com.

Events

Record Power spring & summer shows

During the next few months, Record Power will be appearing at various dealers' premises across the UK and Ireland to answer your questions and demonstrate products from their extensive range. At many of the events, exclusive show deals will be also be available on the day.

When: 17–18 July 2015

Where: Yandle & Sons, Hurst Works, Martock, Somerset TA12 6JU

Web: www.yandles.co.uk

When: 5–6 August, 2015

Where: MacGregor Industrial Supplies-Inverness, Mannsfield Showground, Muir of Ord, Ross Shire, Inverness IV6 7RS

Web: www.macgregorsupplies.co.uk



Inside the Las Vegas Market

Las Vegas Market

Since its launch in the Summer of 2005, this exhibition has become the most comprehensive furniture, home décor and gift market in the Western United States, presenting a unique cross-section of over 2,200 resources in an unrivalled market destination. Twice a year, thousands of retailers and designers come to Las Vegas Market to see what's new, what's hot and to get ahead of trends for the coming season.

When: 2–6 August, 2015

Where: Las Vegas Market, 475 S. Grand Central Parkway, Las Vegas, NV 89106, USA

Web: www.lasvegasmarket.com

Jasper Morrison – Thingness

Jasper Morrison is a designer respected and celebrated around the world. Grand-Hornu is thrilled to host his first-ever retrospective and this major event will bring together key moments in his 35-year career, across furniture, kitchenware and home electronics. These pieces will be accompanied by archival material in a specially designed installation that stays true to his principle of beguiling simplicity.

Jasper has worked with leading manufacturers in Europe, including Cappellini, Alessi, Flos, Magis and Vitra; Japanese brands, such as Muji and technology companies Samsung and Sony.

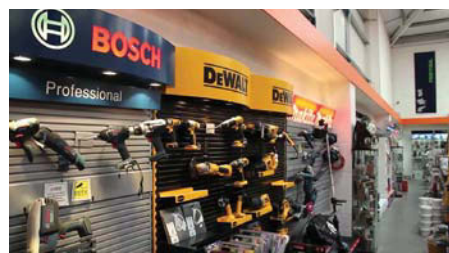
He opened his Office for Design in London in 1986 and currently has offices in London, Paris and Tokyo.

When: Until 13 September, 2015

Where: Le Grand Hornu, Sainte-Louise Street 82, 7301 Boussu, Belgium

Web: www.cid-grand-hornu.be

Toolshow 2015



Expect to see the biggest names in woodworking at Toolshow 2015

Expect to see all the biggest names in the woodworking industry, waiting to show you their new products, answer any questions and offer you some fantastic deals on products. The event organisers are periodically releasing updates on masterclasses and any new exhibitors who have joined, so be sure to sign up for regular emails so you don't miss a thing.

When: 25–26 July, 2015

Where: American Express Community Stadium, Village Way, Brighton BN1 9BL

Web: www.toolshow2015.co.uk

One-day steam-bending course

Taking place at Marc Fish's workshop is this one-day course with Charlie Whinney, who is the UK's leading steam-bending expert. His work is sold internationally and can be found in museums, private residences and commercial premises. Prominent commissions include the Eden Project and Harvey Nichols department store London. Based in Cumbria, Charlie's love of steam-bending is instantly obvious; his passion



Steam-bending expert Charlie Whinney in his workshop

for the subject make him an ideal tutor. Charlie is really hands-on and gets students motivated and excited. This course is included in Marc's full-time one- and two-year courses. The cost of the course is £240 and includes all materials.

When: 18 July, 2015

Where: 'Robinson House studio', Robinson Road, Newhaven, East Sussex BN9 9BL

Web: www.marcfish.co.uk

Make a Krenov-inspired hand plane with Theo Cook



Make a Krenov-inspired hand plane with Theo Cook

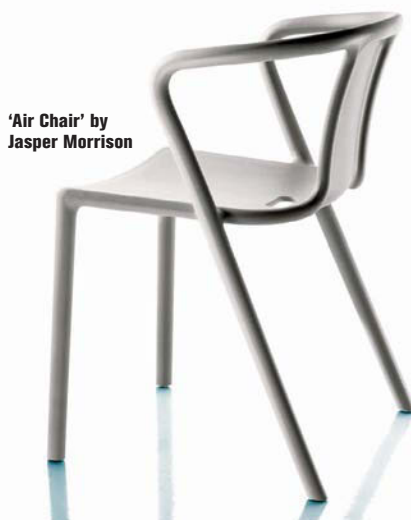
Also taking place at Marc Fish's workshop, this weekend course teaches you how to make a wooden plane. This will involve skills such as bandsawing, routing, drilling, shaping with a spokeshave, sanding and finishing. Students will be provided with a comprehensive booklet at the beginning of the course and leave with a completed plane and the skills and knowledge they need to repeat the exercise on their own. The course is taught by Theo Cook, who trained at the Barnsley Workshop in the UK and under James Krenov at the College of the Redwoods in the US. Materials and blades are supplied; however, if students wish to use their own timber, Marc can advise on sizes required and do the preparation work prior to the course start date if the wood is sent to him.

To see the full list of courses taking place at Marc's workshop this coming year, see his website details below.

When: 29–30 August, 2015

Where: 'Robinson House studio', Robinson Road, Newhaven, East Sussex BN9 9BL

Web: www.marcfish.co.uk



'Air Chair' by Jasper Morrison

■ BUCKS NEW UNIVERSITY

Woodworker's 'Bodger's Stand' sculpture unveiled at Buckinghamshire New University

A charity sculpture of a 'Bodger's Stand' celebrating High Wycombe's furniture history, supported by Hyundai and designed by a student has been unveiled outside Buckinghamshire New University.

Deborah Mills, studying BA (Hons) Fine Art, designed the 4m high and 3m wide sculpture, called 'Bodger's Stand' made from concrete and steel, which stands on the Gateway concourse at the University.

Traditionally, a bodger was a woodworker who used green timber. Bodgers purchased their wood at auction while it was still growing and the lots at auction became known as 'stands', hence the name bodger's stand.

The reason they bought the wood while it was still growing was to ensure



PHOTOGRAPH COURTESY OF BUCKS NEW UNIVERSITY

'Bodger's Stand', by student Deborah Mills

that the timber was green. Bodgers then had 12 months to cut down the trees,

giving them a continuous supply of green timber throughout the year. They worked in the forest turning the green timber using very simple pole-lathes into spindles, which they then took to the chair factories in High Wycombe. This cheap supply of spindles helped to make the Windsor Chair affordable to the working masses, replacing stools and benches, and thus made their lives more comfortable.

Deborah Mills said: "I have made the Chiltern Hills my home for the last 16 years and so it has been a privilege to work on a sculpture that celebrates the culture and heritage of this beautiful area. I would like to thank all concerned for helping to realise my vision and I feel very proud to have a work of this scale and ambition in the town of High Wycombe."

The construction of the sculpture was partly paid for through sales of a lapel badge designed by Bucks New University BA (Hons) 3D Contemporary Crafts & Products student Craig Wood. To find out more about courses at the University, see www.bucks.ac.uk.

■ CHIPPENDALE INTERNATIONAL SCHOOL OF FURNITURE

Scottish furniture school creates Jupe table with political attitude

To mark the recent general election, staff and students at the Chippendale International School of Furniture made a Jupe table with political attitude. In its smallest configuration it's an unremarkable round blue table, but it's actually a table based on a design by the 19th-century French cabinetmaker, Theodore Alexander Jupe.

Its secret lies in a complex concealed mechanism, so that when the tabletop is turned, its sections move outwards. The table, however, retains its shape,

expanding to become a larger round table. Fit in some additional wooden slats and the table becomes a Saltire, Scotland's flag, but give it another twirl, fit in some more slats and it's transformed into a Union Jack. "We wanted to make a Jupe table as a bit of fun and to explore the complexity of Jupe's design," said Anselm Fraser, principal of the school which is this year celebrating its 30th birthday.

The School was named winner of the Best Business category in East Lothian at the 2014 Best of the Best Business Awards

and is acknowledged as one of the finest furniture design and restoration schools internationally. At the end of last year, the School also won a Best Business Award in the small to medium-size category – an award that recognised how the School has enhanced the reputation of the UK as a centre of excellence in woodworking and craftsmanship. To see the video of the table, visit www.youtube.com/watch?v=TI82b__xkb0&feature=youtu.be. To find out more about the school, see www.chippendaleschool.com.



PHOTOGRAPHS COURTESY OF THE CHIPPENDALE INTERNATIONAL SCHOOL OF FURNITURE

The table at the start...



... once moved, the table displays the Scottish flag

■ RYCOTEWOOD FURNITURE CENTRE

Furniture Craft in Oxford

In 2004, the Rycotewood Furniture Centre moved from Thame to Oxford after almost 70 years. New workshops witnessed the development of new courses: the Foundation degree and subsequent BA (Hons) degree in Furniture Design and Make. 2015 will see the 10th year of graduations in Oxford and the course is going from strength to strength with record numbers of applicants.

Students will be exhibiting their work at the Summer Show in the City of Oxford College as well as a five-week exhibition at the Old Fire Station in the centre of Oxford. Work on show will demonstrate an exciting and innovative combination of different materials and processes and students have produced functional pieces of furniture, reflecting a high degree of craftsmanship.

The Furniture course aims to enable students to develop and extend the skills necessary to acquire a personal voice within the discipline of wood. Students have exhibited and sold work nationally and internationally and have gone on to pursue careers as designer-makers and onto post-graduate education – the exhibition will

also be highlighting past students' successes as part of each event.

Recent successes include Dan Harrison and Sam Bolt who were awarded the prestigious Alan Peters Award in 2014. Two of the students were winners in the 2014 New Forest Trust competition: Jan Waterston was awarded first prize in the craft category while Sam Bolt was successful in both the craft and design sections. Stuart Evans received a City and Guilds Medal of Excellence; Tom Parfitt was selected as a finalist in Heal's Discovers 2014 and was commissioned to design outdoor benches for The Queen's College, Oxford.

Students have entered a range of national competitions this year and the first winner, Jan Waterston was awarded first prize in the



PHOTOGRAPH COURTESY OF DREW SMITH

Jan Waterston's winning chair design

Art in Action student competition.

A number of students have received bursaries from generous benefactors that include the Worshipful Company of Furniture Makers, Rycotewood Association, NADFAS and the Horlock Educational Trust. Jan Waterston, Sam Bolt and Charlie Nash were among over 20 students to receive a prize. The Rycotewood Summer Show private view and exhibition took place last month, showcasing a wide range of upcoming furniture-making talent. See www.cityofoxford.ac.uk.

■ READING COLLEGE

Students have designs on new school furniture

Primary school children are enjoying the great outdoors thanks to some new garden furniture designed and made by college students. The Reading College students have created a range of tables and stools for pupils at Trinity Christian School in Glebe Road, Reading.

The project, completed by students on the foundation pathway in construction, involved recycling old wooden pallets to create a range of practical furniture designed to meet the pupils' needs. The students developed a range of designs before creating a prototype to test with the schoolchildren and finally made three tables and 12 stools, which have now been painted in colours requested by the pupils.

Danny Joshi, one of the students involved in the project, said: "It was a pleasure making these amazing chairs and tables for the little ones. I developed lots of teamwork skills and learnt how to paint for the first time." The tables and chairs are now in place at the school, where they will also be used for outdoor dining.

Naomi Mobbs, head teacher at Trinity School said: "We are so impressed with the students for designing, planning and making some well-crafted tables that are practical and eye catching. The children were thrilled with them and were particularly pleased that the students had taken into account their ideas when doing the research at the beginning of the project. As soon as the students left, we all took our lunches outside and enjoyed a picnic at the new tables."

Dan Towers, Foundation Construction tutor, said: "The project has been a great success. The sense of achievement the students have gained seeing an old pallet waiting to be thrown out, turn into a piece of furniture people would pay good money for is priceless. The skills and knowledge they have gained during the process will put them in a strong position as they progress into work or further study next year."

For more information, see www.reading-college.ac.uk.



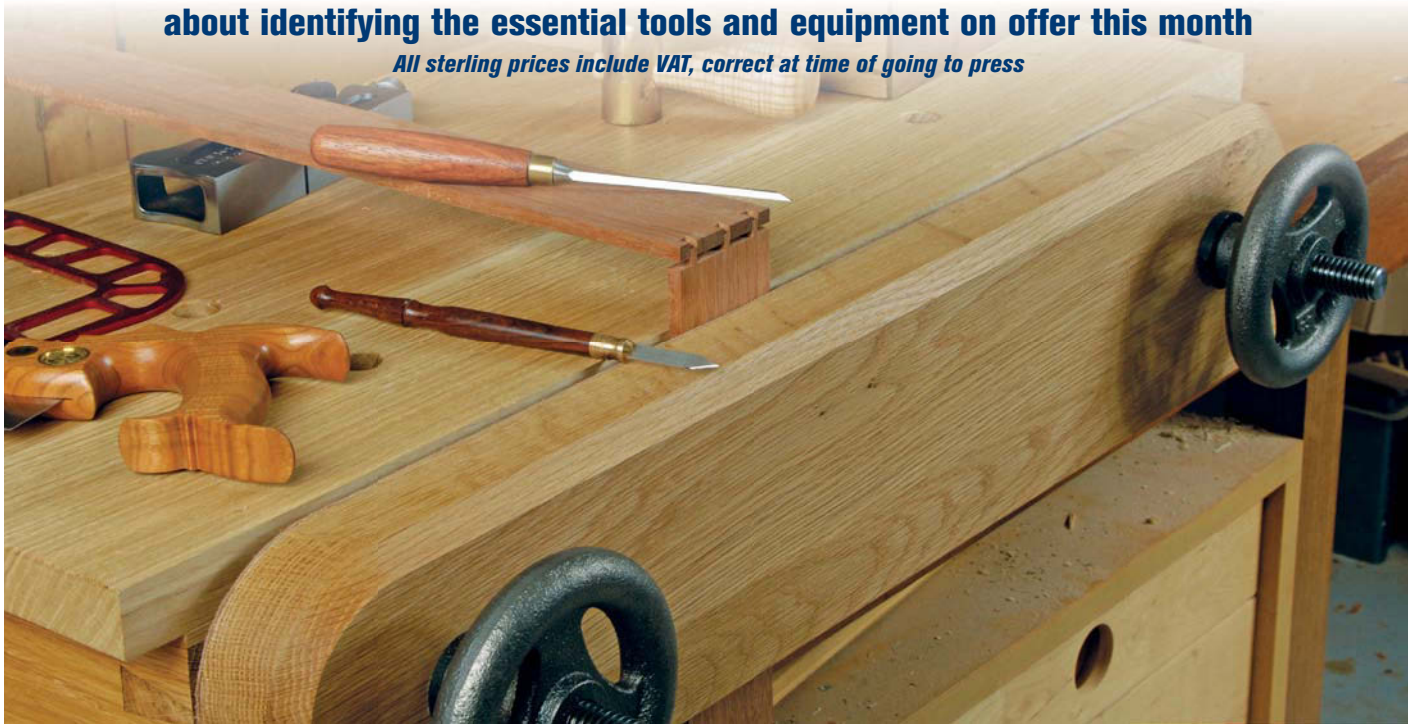
Reading College students design outdoor furniture for a local primary school

If you're a member of a collective and would like to raise your profile then submit a story to teganf@thegmcgroup.com

Editor's round-up...

Having trouble sourcing the right tool for the job? Derek Jones sets about identifying the essential tools and equipment on offer this month

All sterling prices include VAT, correct at time of going to press



PHOTOGRAPH BY GIANLUIGI JONES

The last few weeks have been a blast getting used to working with the new Moxon-esque vice. If that sounds as if it was a difficult transition, nothing could be further from the truth. If there is a downside, and there's always a trade-off, it's likely to be the weight – let's just say I won't be storing it under the bench. Since last month, we've been on the lookout for a basic set of green woodworking tools and come up with what you might consider a range to get started: axe, wedge, froe and drawknife. In the months ahead, we'll take a look at some of the workholding devices you might need to go with these to complete the picture. Some of these and more are included in our feature this month by American craftsman Peter Galbert from his book *A Chairmaker's Notebook* on page 31.

Closer to home it looks like the German power tool brands might be reading from the same hymn sheet once again. Bosch's new FlexiClick 5-in-1 cordless drill driver package has launched this month with a coupling system that looks a tad familiar. Benchwise, if you're looking to get ahead with your sharpening, then look no further than the Veritas MkII Honing System. This system is one of the go-to jigs to complement the full range of Lee Valley/Veritas edge tools but will handle a whole lot more besides. We're going to be taking a closer look at this piece of kit in a few months' when we've spent some time with it. Meanwhile, here's a selection of more items we've uncovered this month.

Makita's new L class dust extractor range

The latest range of L class dust extractors from Makita exceed the performance required by health and safety standards for wet and dry cleaning applications as well as the legal dust extraction requirements when working with non-hazardous materials.

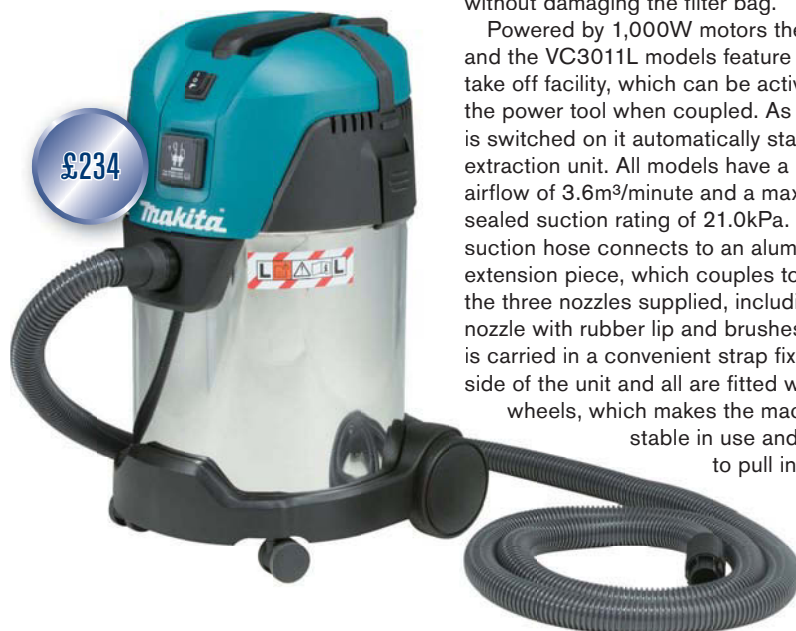
These extractors have a new motor housing design with a flat top and integrated carry handle and accessory storage while the filters are housed above the tank line

to maximise the holding capacity. Stainless steel tanks are fitted to the 20 and 30 litre models while the 25-litre unit has a moulded ABS tank which reduces weight to just 7kg, making it ideal for site transport.

Products in the new Makita extractor range feature washable PET cartridge filters to protect the suction turbine for fine dust and debris. The air flow can be driven through the filter by pushing the pipe valve, which cleans the filter in seconds. The fleece filter bag allows you to pick up moist debris without damaging the filter bag.

Powered by 1,000W motors the VC2012L and the VC3011L models feature a power take off facility, which can be activated by the power tool when coupled. As the tool is switched on it automatically starts the extraction unit. All models have a maximum airflow of 3.6m³/minute and a maximum sealed suction rating of 21.0kPa. The 3.5m suction hose connects to an aluminium extension piece, which couples to either of the three nozzles supplied, including a floor nozzle with rubber lip and brushes. The hose is carried in a convenient strap fixing on the side of the unit and all are fitted with castor wheels, which makes the machines

stable in use and convenient to pull into location.



Veritas Mk.II Honing System

The main feature of the Veritas Mk.II is its blade registration system, which squares and sets the blade in one easy step. The Mk.II Guide has three bevel angle range configurations: a high angle – 25-54° in seven increments – standard –15-40° in six increments – and a third for back bevels. The registration jig slides onto the guide body, centring and squaring the blade using an integral fence. The clamping mechanism registers on the face of the blade and is designed to accept flat and tapered blades, as well

as blades with irregular geometry. The Mk.II features a three-position eccentric roller allowing a micro-bevel to be honed quickly and accurately after only a simple turn of a knob. The 50mm wide roller is stable for even the narrowest of blades. The guide can easily accommodate chisels or blades from 6-72mm wide and up to 13mm-thick, including spokeshave blades. Sharpening stone not included. Manufactured from die-cast zinc alloy with precision-machined brass and steel parts.



From
£107.12

Triton's T12 range expansion

Triton's newly-expanded T12 range combines precision engineering with enough power and torque for every performance drilling, driving, fastening application, and now features cutting and sanding capabilities.

Equipped with the latest Mabuchi motors and robust, all-metal gearing, these compact tools are powered by two efficient 1.5Ah Li-Ion Samsung-cell batteries. The included one-hour charger delivers a rapid 30-minute charge to 80% capacity, keeping downtime to a minimum.

Built-in LED worklights provide clear visibility in murky conditions, and the comfortable moulded grips allow easy handling and control over extended periods.

For example, the T12DD drill driver features a 10mm removable single-sleeve keyless chuck and provides 22Nm torque with 17-stage torque adjustment for a variety of materials and screw sizes and the T12ID impact driver delivers 90Nm of sustained torque and an impressive 3,000 impacts-per-minute for extra power and force during high-speed driving. The T12 range is extended with the following new tools: the T12AD angle drill; the T12OT oscillating multi-tool and the T12FL swivel-head torch. The T12s are available individually or in convenient twin packs for all your drilling, driving, fastening, cutting and sanding needs. Now available from all Triton stockists.



£59.95

Auriou 230mm curved drawknife

Available from Classic Hand Tools and hand forged at Forge de Saint Juery, France, home of Auriou Toolworks, the 230mm long curved blade on this drawknife has a gentle radius and an effective blade angle that gives fast, controlled cutting. Turned 125mm French walnut (*Juglans spp.*) handles with brass ferrules are spaced 330mm apart. There is a slight splay to the handles – about 8° – which makes the action of drawing the knife toward you more comfortable – of course, there are dozens of views on this but based on feedback received on their prototypes and the study of old designs, Auriou decided this was the best compromise. The drawknife comes honed and ready for use. Also available is a handmade quality leather protective sheath to protect you, your friends and the cutting edge from damage. This superior quality sheath is made by Kate Langley Jones from Essex.



From
£84.25

JIG IT Deluxe Concealed Hinge Drilling System

Rockler Woodworking and Hardware has introduced a line of jigs and templates to simplify installation of Euro-style concealed hinges. The JIG IT Deluxe Concealed Hinge Drilling System allows users of almost any skill level to install concealed cabinet hinges with just a hand drill and a few speciality bits. Whether updating cabinets or building new ones, precise hinge placement and installation are necessary for properly functioning cabinet doors. The sophisticated JIG IT system allows users who have only basic tools and skills to drill perfectly positioned, perpendicular holes of proper depth. Without the JIG IT system, concealed hinge installation typically requires a drill press and is a tedious process which requires a larger skill set to complete.

The jig features a 915mm aluminium rail

and two hinge cup drilling guides that slide independently along the rail to the desired hinge locations, then lock in place for repeatability. The drilling guides show where to drill the hinge cup holes with a 35mm Forstner bit. For large cabinet doors that require more than two hinge cups, single-cup Concealed Hinge Drilling Guides are available to complete the line of hinge cups needed to install the door.

Once users have drilled the cup holes in their cabinet doors, the next step is to install the



£78.55

- cabinet. Rockler offers seven different JIG IT Hinge Plate Templates that are each made to install a specific type of concealed hinge plate. The template needed for installation is based on the type of concealed hinge and whether the cabinet has a face frame or is frameless. Each JIG IT Template features an acrylic drilling plate mounted on top of an edge guide, which provides proper spacing from the edge of the frame. All the user has to do is drill the holes through the template with a self-centring drill bit, then install the hinge plate with screws. Note: The JIG IT Hinge Plate Templates work with specific models of hinges and require a specific self-centring drill bit, sold separately.

The Robin Wood axe

Available from green woodworker Robin Wood, this razor sharp axe will do anything from felling small trees and splitting firewood to splitting kindling, but what it really excels at is carving.

The head of the axe is drop forged abroad but ground and honed by Brian Alcock, the last professional grinder in Sheffield. The hickory (*Carya spp.*) handle is made in the UK to Robin's design and features a good, grippy knurled finish, which is treated with linseed oil. This axe is also ideal for bushcraft or camp use. The weight of the head is 500g, the total weight is 760g and the handle length is 340mm. This is a good

weight and size of axe that Robin finds most people can use easily without getting tired, but is still heavy enough to remove wood quickly. See Robin's website for a video on how to sharpen the axe.



Proxxon MICROMOT mill drill

The MICROMOT 230/E is a truly all round tool, designed for drilling, milling, grinding, polishing, brushing, cutting and engraving. With a diameter of 37mm and weighing just 270g, it offers easy handling and is without equal in its class. The extremely slim housing of glass-fibre reinforced polyamide with a soft component grip area enables the unit to be handled as a pen would be held.

The MICROMOT mill drill has a balanced, low noise, special DC motor with long life expectancy. The maximum speed of 21,500rpm can be continuously reduced to 6,500rpm through full-wave electronics. This tool offers nearly the same level of torque in the lower speed range. This is especially important for micro-drilling, brushing and polishing.

The tool has a ground, ball-bearing spindle and comes with high quality MICROMOT steel collets so that even the smallest shafts are accurately clamped. There is no rattling or vibrating of bits and cutters. The spindle for tool exchange can be locked at the push of a button and there is a 20mm collar for use in drill stands and horizontal stands. Please note that this price is valid until 31 December, 2015.

Ochsenkopf OX 42-1050 aluminium safety wedge

Available from Workshop Heaven, this Ochsenkopf safety wedge is made from soft lightweight aluminium, so unlike steel wedges, can be driven in safely with the reverse face of a steel splitting hammer. The grooves in the faces help the wedge to remain straight and prevent it from jerking back. Suitable for felling and splitting. Length 260mm; width 60mm; stroke height 40mm and weighs 1,050g.



Clarke CBS300 305mm professional bandsaw & stand

This high quality, floor standing wood cutting bandsaw is ideal for small to medium workshop use. It features a strong steel body with a solid ground cast-iron table providing a rigid working surface. Balanced cast alloy wheels contribute to a smooth running machine.

The table tilts 45° and has the usual twin roller bearing blade guides above and below the table. A tension indication window allows quick reference to the state of the set-up. A quick-release blade tensioning lever speeds up blade changes if you want to work on your pitlane technique. It's a small detail but we quite like the flexible LED work light. A multi-step dust extraction outlet allows direct connection to a dust extractor and a handy tool holder keeps the essential spanners and hex keys with the machine. This bandsaw has a 750W motor and is supplied with stand, a 4tpi, 2,240mm long blade – that you'll probably want to replace immediately – rip fence, mitre guide, mitre gauge and pushstick.

With a throat depth of 305mm, this machine has all the ingredients of a good all round bandsaw.



Ray Iles premium froe

Also available from Workshop Heaven and made by Ray Iles from EN9 spring steel, the premium froe is the same size as the large froe they stock, but the canals are rounded, which makes it more efficient at moving through the wood and thus easier to use. The tool comes complete with a 355mm beech (*Fagus spp.*) handle.





Expanded selection of cross-grain wood veneer

Oakwood Veneer has recently expanded its offering of in-stock 8 × 4ft cross-grain sheets. The list now includes over 50 total species, including exotics such as Karelian birch (*Betula pendula*) burl, euro-steamed beech, birdseye maple (*Acer saccharum*), English figured sycamore (*Acer pseudoplatanus*), South American rosewood (*Aniba rosaeodora*), figured eucalyptus (*Eucalypt spp.*) and more. All cross-grain sheets come pre-sanded, which saves you a significant amount of time and effort.

Many domestics are now also available in even longer cross-grain 10 × 4ft and/or 12 × 4ft sizes, including ribbon mahogany

(*Khaya senegalensis*), maple (*Acer spp.*), oak (*Quercus spp.*), cherry (*Prunus spp.*), walnut (*Juglans spp.*) and more. All in-stock sheets ship the same or next day and have a one-sheet minimum order. Additionally, customers can special order most other domestic and exotic species which are not immediately in-stock on cross-grain with a two week lead time and four sheet minimum.

Oakwood Veneer holds a very large selection of in-stock veneer species, sizes, backers, grain patterns, and now, a significantly larger selection of cross-grain – also known as counter front – horizontal veneer sheets.



Bosch FlexiClick 5-in-1 cordless system

FlexiClick from Bosch helps professionals master virtually any task. The system comprises the new GSR 18 V-EC FC2 Professional cordless drill/driver with drill chuck, offset angle and angle adaptors. In addition, Bosch is the first manufacturer to offer a rotary hammer adaptor, making the FlexiClick the most versatile cordless system on the market.

The applications that are achievable with the FlexiClick system range from standard screwdriving through to drilling wood, metal and even concrete. This enables professional tradespeople to work precisely, even in hard-to-reach areas. Perfect for kitchen fitters, cabinetmakers and other tradesmen working in confined conditions.

The GSR 18 V-EC FC2 Professional cordless drill/driver has a hex bit holder, which can be used with all standard bits and is the only screwdriver in its class to have a bit lock function.

The GFA FC2 Professional drill chuck adaptor has an Auto-Lock function, works with drill bits up to 13mm and enables precise drilling in tight spaces. The cordless drill/driver and adaptor combined are only 205mm long.

The GEA FC2 Professional offset angle

adaptor allows for precise screwdriving close to edges.

16 working positions can be selected without having to remove the adaptor.

The GWA FC2 Professional angle adaptor enables tradespeople to effectively drive screws round corners and is very compact with its length of 95mm.

Lastly, the GHA FC2 Professional rotary hammer adaptor transforms the cordless drill/driver into a powerful SDS-plus rotary hammer. The hammer mechanism is integrated into the adaptor and unlike conventional combi drills, can drill effortlessly even in concrete.

Simply turn, click, and it's in place. The four FlexiClick adaptors are connected to the cordless drill/driver in the same way: simply place the adaptor on the FlexiClick interface and turn it clockwise. Repeated clicking then indicates a secure connection – and the system is ready to use. It is also the only system where the adaptors can remain on the tool when you are adjusting them.

The FlexiClick System is the latest of the Bosch 'dynamicseries', compact professional tools with impressively long battery runtimes, fast work rates and short battery charge times. *F&C*

Contacts

Auriou 230mm curved drawknife

Contact: Classic Hand Tools

Tel: 01473 784 983

Web: www.classichandtools.com

Bosch FlexiClick 5-in-1 cordless system

Contact: Bosch

Tel: 03447 360 109

Web: www.bosch-pt.com

Clarke CBS300 305mm professional bandsaw & stand

Contact: Machine Mart

Tel: 01159 565 555

Web: www.machinemart.co.uk

Expanded selection of cross-grain wood veneer

Contact: Oakwood Veneer

Tel: (001) 800 426 6018

Web: www.oakwoodveneer.com

JIG IT Deluxe Concealed Hinge Drilling System

Contact: Rockler Woodworking and Hardware

Tel: (001) 800 279 4441

Web: www.rockler.com

Makita's new L class dust extractor range

Contact: Makita

Tel: 01908 211 678

Web: www.makita.co.uk

Ochsenkopf OX 42-1050 aluminium safety wedge

Contact: Workshop Heaven

Tel: 01295 678 941

Web: www.workshopheaven.com

Proxxon MICROMOT mill drill

Contact: BriMarc Tools & Machinery

Tel: 03332 406 967

Web: www.brimarc.com

Ray Iles premium froe

Contact: Workshop Heaven

Tel: 01295 678 941

Web: www.workshopheaven.com

The Robin Wood axe

Contact: Robin Wood

Tel: 01433 670 321

Web: www.robin-wood.co.uk

Triton's T12 range expansion

Contact: Triton Tools

Web: www.tritontools.com

Veritas Mk.II Honing System

Contact: Axminster Tools & Machinery

Tel: 03332 406 406

Web: www.axminster.co.uk

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Tiger 11/250	2.5HP 9.5	24ltr	£119.98	£143.98
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Tiger 11/510	2.5HP 9.5	50ltr	£149.98	£179.98
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Bosch	1400	0-55	£74.99	£89.99

POF1400ACE

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CSA16V	1200w	400-1700	£79.98	£95.98
CSA400B	90W	550-1600	£99.98	£119.98

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Fury 3	210/25.4	60/200mm	£119.98	£143.98	
Inhell	250/30	75/340mm	£159.98	£191.98	
TH-SM2534					
Makita	260/30	95/130mm	£199.98	£239.98	
LS1040					

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MODEL	MOTOR	FLOW RATE	BAG CAP.	EX VAT	INC VAT
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CBG6RZ	PRO	150mm	£37.99	£45.99
CBG6RSC	HD	150mm	£47.99	£57.99
CBG6SB#	PRO	150mm	£49.98	£59.98
CBG6RWC	HD	150mm	£54.99	£65.99
CBG6W (wet)	HD	150/200mm	£55.99	£67.19

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RAGE5	55mm	79mm	£269.00	£322.80

*FURY power: 1500W (110V available)
*RAGE power: 1800W/230V (110V available)
table extensions included
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Takenaka Carpentry Tools Museum – Japan

John Adamson visits Takenaka Carpentry Tools Museum in Kobe and learns more about this temple to Japanese wooden architecture



Japan in late spring and the trees are in full leaf everywhere: in the Imperial Palace Gardens in Tokyo; in the Kenroku-en, those glorious gardens in the heart of Kanazawa; and across the countless acres of deciduous and coniferous woodland spreading over more than two thirds of the nation's rugged land-mass. On the fringes of the woods and forests wisteria (*Wisteria floribunda*) is in full bloom, its pale purple blossoms hanging from the trees like trails of Japanese characters.

Behind Kobe, the city built around a deep-sea harbour an hour away by suburban train from Kyoto, the wooded hills rise up in a gamut of greens to meet the sky. At the top of the city, only a few minutes' walk from Shin-Kobe, the new railway station on the Sanjō Shinkansen line, stands the Takenaka Carpentry Tools Museum in its brand-new purpose-built home set in its own leafy grounds, with tree-clad Mount Rokkō as backdrop.



The main entrance and a perspective view of the front elevation of the Takenaka Carpentry Tools Museum, Kobe



The full-scale model of a pillar from the Golden Hall of the Buddhist temple Toshodaiji in Nara stands majestically in a central void and may be viewed from the ground floor as well as from the lower level. The model displayed top left is a carpenter's stereotomy showing a hip rafter with fan and parallel raftering. The plan on the wall is an illustration from *Kikushinjutsu Nokimawari Zukai* – a manual of stereotomy by Masatoyo Suzuki, 1847

◀ The Takenaka Corporation

The Takenaka Corporation, one of Japan's leading architecture, engineering and construction companies, first opened Japan's only museum of carpentry tools in 1984 in Nakayamate, Kobe, to mark the 85th anniversary of its incorporation in the city, home of the firm's first headquarters. But the company's roots go back to the beginnings of the Edo period when a shrine and temple carpenter in Nagoya named Takenaka Tobei Masataka was put in charge of construction and building maintenance by the ruling feudal lords in 1610. Since then, the firm's activities have spanned centuries of construction from the traditional Japanese woodworking methods of the Edo period to the most advanced technologies of today.

The Takenaka Corporation now boasts a state-of-the-art technical research institute said to be the largest in the world, including a wind-tunnel testing laboratory and a large-scale earthquake simulator. It has long-term plans for environmental action to 2050 that take into account the well-being of inhabitants and to promote creativity and sensitivity in design to produce a built environment which is 'close to human'. Its declared targets are to set up a zero-carbon pilot project by 2020, construct zero-carbon buildings by 2030, and carbon-

minus buildings by 2050. "Takenaka," so the company asserts, "is not just building buildings, we are building the future."

Why the museum?

What made a go-ahead company renowned for its innovative landmark buildings publicly display such a special interest in traditional carpentry? Why this link with the past? Clues may be found in the philosophy of the corporation that converges with that of the museum. If, on the one hand, the Takenaka Corporation built the Tokyo Dome, Japan's first large-scale stadium, with an air-supported membrane roof, it has also undertaken, after painstaking excavation and research, the rebuilding of the 8th-century Daigokuden Imperial Hall in Nara using traditional methods. One of the largest examples of wooden architecture in Japan, the hall's base-isolation and earthquake-resistant clay walls help ensure that the building meets contemporary building standards.

Until the Meiji period in the late 19th century, Japanese architecture was predominantly of wooden construction. Thanks in part to the skill and techniques of its carpenters, Japan evolved a unique way of working wood and their tools undoubtedly played an important role in the development of architectural styles. Through constant use

and the repeated sharpening of their cutting edge, tools wore out and were replaced making their preservation rather uncertain. Modern technology – mechanisation and electrification – caused hand tools to be used less and less.

Aware of the potential loss of one part of the nation's culture through the gradual disappearance of hand tools, the Takenaka Corporation, with its own history dating back to 1610, established the museum. The corporation's official prospectus, published in July, 1984, was very clear in its resolve:

"The Museum has two main purposes: firstly, to collect and preserve excellent tools from the past; secondly, by researching and exhibiting these special tools, to convey to future generations the spirit and attitudes of traditional Japanese carpenters and blacksmiths.

"By permanently undertaking these activities, the Museum will continue to contribute to the preservation and the further development of Japanese architecture."

How inspired it is then that the museum should be the brainchild of a leading construction company. The firm's looking into the future is counterbalanced by its looking into the past – into the legacy of craftsmen down the ages not only in Japan but in the wider world.



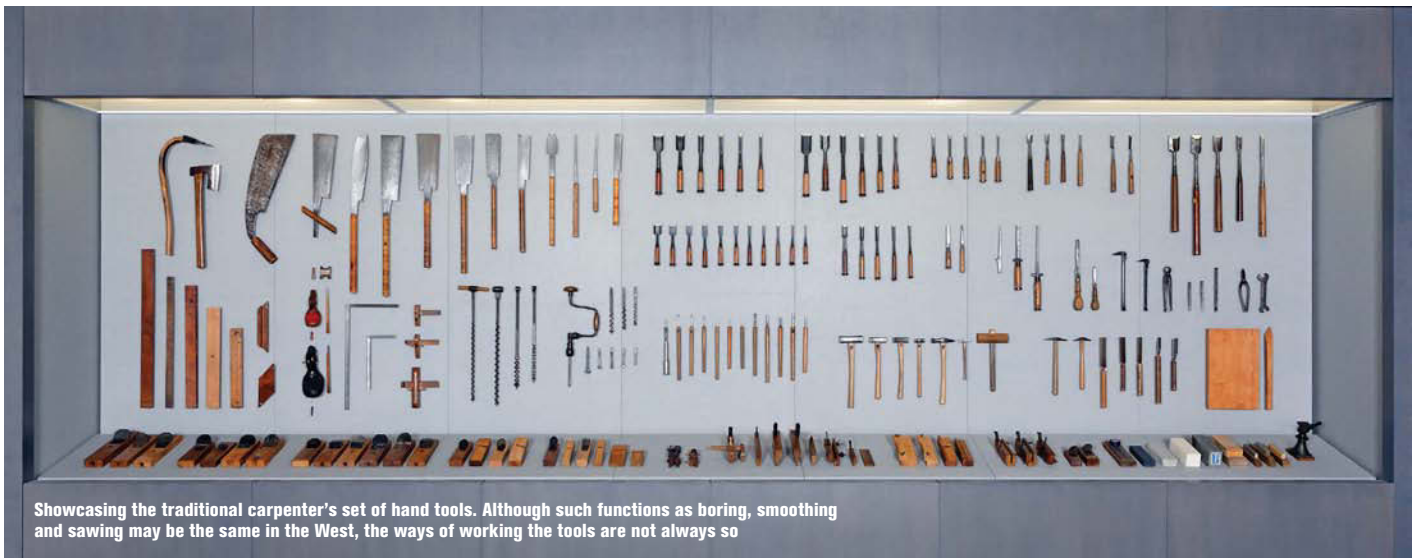
Rafters in Nara cedar float over the lobby; the chestnut doors of the main entrance may be seen in the far corner

The new building

Outgrowing the old building in Kobe, the museum relocated to a residential area of the city, opening on 4 October, 2014 in a 19,000 sq.ft building. Designed by three of Takenaka's own architects, it subtly blends

traditional craftsmanship with modern structural techniques. The heavy tiled roof, for example, is borne by upward-curving steel beams hidden from view by the vast lobby and lecture theatre ceiling of narrow serried rafters made in Nara cedar that

lends lightness and gracefulness to the structure. The museum's leaflet challenges the visitor to identify whether a given element of the building employs traditional or contemporary skills in the woodworking, plastering and tiling.



Showcasing the traditional carpenter's set of hand tools. Although such functions as boring, smoothing and sawing may be the same in the West, the ways of working the tools are not always so

Preservation and research

If one of the museum's main objectives should be the preservation of traditional hand tools from around the world, the museum was not built so much as a shrine to relics of the past but as a temple to the wonders of wood and to the ingenuity of man building with it.

Mostly architectural historians by training, the curatorial staff have a vast reserve collection at their disposal: "We have collected more than 30,000 items from Asia and Europe, of which almost 20,000 are tools," says Dr Marcelo Nishiyama, the museum's chief researcher. "We only put around 1,000 tools from our collection on show."

Yet the research work is ongoing and the search continues for quality tools from around the world. "Of European tools, we have collected more than 2,000 items, mainly from England, France, Germany, Austria and a few from Italy," enthuses Dr Nishiyama. "Now I am hoping to start on the Scandinavian countries. Also I am gathering tools from South-East Asian countries such as Indonesia, Thailand and Malaysia."

The exhibition

The exhibition gallery on two underground levels is divided into seven sections. In 'Tools and Handwork' and 'Exquisite Works of Master Craftsmen', visitors are invited to look closely at the tools themselves, and in sections like 'Learning from a Master Carpenter', visitors learn about how the tools are used in the building process. A huge showcase in the 'Tools and Handwork' section displays a traditional carpenter's standard set of hand tools from the early Shōwa period. There is a surprising kinship with the double-page engraving of a set of French tools reproduced in Bergeron's *Manuel du Tourneur* from the early 19th century, some 125 years earlier. The tools' functions of boring, smoothing and sawing are the same even if the ways of working the tools may differ, sometimes considerably.

One of the most captivating images of our visit is of a Japanese plane – one that is drawn rather than pushed – from which the



A selection of marking tools from the familiar plumb line and bob to the Japanese *sumitsubo* – ink pot – that is used to snap a straight or curved line on wood in ink with a fine silken cord rather than in chalk with a coarse string as in the West



Perfect planing: a feat of Japanese workmanship

◀ broadest shaving imaginable is escaping like a rippling sheet of finest gauze. The finish to the planed block of wood is crisp as opposed to the dull smoothness of sanding, but it is only achievable with the sharpest plane iron honed to perfection on a whetstone.

At the time of our visit the museum was holding a special exhibition 'Tools of a Master Craftsman' that featured a remarkable selection from the work of the revered blacksmith and tool-maker Chiyozuru Korehide (1874–1957), whose family were swordsmiths prior to 1876, when the samurai lost their right to wear swords. Besides beautifully wrought plane irons and chisels from his output, there is a life-size model of his smithy or workshop on permanent display.

A full-scale model of one of the ornate pillars from the Golden Hall (*kondō*) of the Buddhist temple Toshodaiji in Nara stands in a dominant position in a central void and may be viewed from the ground floor as well as from the lower level. Here is a supreme instance of carpentry done with the precision and pride of a cabinetmaker. A few steps away from the foot of the pillar

there is a well-appointed workshop, where practical events for both adults and children are provided under the guidance of the museum's resident temple carpenter.

The nearby section 'Making the Most of Wood' provides one of the most enduring memories of the whole museum. A stand of tall logs chosen from the main types of timber used in Japanese wooden architecture presents an image that is almost totemic. Each log has been sawn along its length and then planed smooth to show the grain as it changes across the heart of the log. At the foot of each upright log stands a transparent plastic bin full of shavings from the log. You can lift any lid, dig your hand into the shavings and scoop up a handful to feel and to sniff: Japanese cedar (*Cryptomeria japonica*); Hinoki cypress (*Chamaecyparis obtusa*); red pine (*Pinus densiflora*); Hiba cypress (*Thujopsis dolabrata*); tsuga (*Tsuga sieboldii*), a conifer which has insect-proof properties; chestnut (*Castanea crenata*); zelkova (*Zelkova serrata*); Japanese cherry (*Prunus serrulata*), each has its own subtle and evocative fragrance.

The section 'A Journey through History' provides the visitor with a history of hand tools from Stone Age axes and adzes through to Japanese hand planes, whereas the section 'Tools around the World' offers a small but informative display of European tools with a sample German timber-building structure.

'Traditional Beauty of Japanese Wa' features a delicate 'skeleton model' of part of the teahouse building that still stands within the museum complex and had been designed and built by Kaichiro Usui in 1958 for the Takenaka family, whose home once stood on the site of the museum.

Wa conveys the Japanese sense of harmony. It is a feeling that pervades not just this section but the whole museum. The director, Kenzo Akao, and his staff deserve all the plaudits they can get for creating what is arguably one of the best specialised museums to be seen anywhere. Through good, uncluttered and well-labelled



Chiyozuru Korehide (1874–1957), one of Japan's most revered tool-makers, came from a family of swordsmiths

displays skilfully divided into digestible self-contained sections; through well-written and clearly spoken audio guides available in English, Japanese, Korean and Chinese, through touch-screen videos of carpenters performing various tasks, the world of woodworking is brought to life. To Western eyes the museum encapsulates aspects of the Japanese character: attention to detail; the quest for perfection; respect for natural materials. You come away feeling satisfied that you have learned something and have a better understanding of Japanese aesthetic sensibilities.

As we made our way out of the museum at the end of our visit, we spotted on the main reception desk the dispenser for adhesive tape – it too had been beautifully fashioned in wood. We stepped outside the museum and the great doors of adzed chestnut planks shut silently behind us. *F&C*

Japanese carpentry in the West

The museum is coming to the West with three exhibitions on Japanese carpentry in Finland this year: at Lahti, Helsinki and Jyväskylä; and there are plans afoot for exhibitions in Germany, and, Dr Nishiyama hopes, soon in the UK

8 June–31 August, 2015

Pro Puu Galleria – Lahti

Web: www.propuu.fi

Title: 'Puu & Perinne', in English 'Wood and Tradition'

1 Sept–15 November, 2015

Museum of Finnish Architecture – Helsinki

Web: www.mfa.fi

Exhibition title not yet fixed

17 Sept–5 December, 2015

Craft Museum of Finland – Jyväskylä

Web: www.craftmuseum.fi/english

Exhibition title not yet fixed



公益財団法人 竹中大工道具館
TAKENAKA CARPENTRY TOOLS MUSEUM

Contact details

Takenaka Carpentry Tools Museum

7-5-1 Kumochi-cho, Chuo-ku,

Kobe 651-0056, Japan

Web: www.dougukan.jp



In the section 'Making the Most of Wood' the process from trees to lumber is clearly explained and through a hands-on display visitors can learn some of the characteristics of the woods used in Japanese architecture

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The new BS600 bandsaw is an exciting new addition to the range. A professional quality bandsaw at a great price. The BS600 has cast iron wheels with electro-mechanical braking giving easy smooth cutting with safety.

Ideal for all type of wood, and composites, it can also take up to a 35mm blade for the occasional rip cut. Electrically interlocked doors - exceptional value for money.

Technical Specification:

wheel diameter	600mm
throat	580mm
depth under guide	370mm
Blade width	10-35mm
motor power	2.2 kw 3.0 hp
table size	700 x 608 mm
table tilts	0-20 degrees
blade length	4470 mm
dust outlet	100mm
Shipping	230x860x2080mm

ITECH C300 Universal Woodworker 220v 1 phase



£4194
inc VAT

The new C300 Universal Machine is the latest addition to the ITECH family. It has been specifically designed for the small professional workshop or home user. This industrially rated machine features a table saw and sliding table, planer, thicknesser and spindle moulder unit. The cast iron construction, accurate cross cut fence and superb build quality put this machine in a class of its own.

Features:

Panel saw sliding beam
Scoring saw for veneered boards
Accurate cross cut fence with flipstops
Cast iron tables
Sturdy swinging arm squaring frame
3 x 2.0 hp class 1 motors

Technical specification:

PLANER:

Max planing capacity:	300 x 220mm
Length of tables:	1500mm
Cutter Block Dia :	70mm
Fence angle tilt:	90° 45°
No of knives:	3 300x20x3
Max Stock removal	4 mm
Feed rate:	7 m/min

CIRCULAR SAW:

Blade tilt:	0° - 45°
Blade diameter:	250mm
Scoring Blade	90 mm
Max blade height 90°:	80mm
Sliding carriage:	1250 x 315 mm
SPINDLE MOULDER:	
Shaft Stroke	115 mm
Shaft Dia	30 mm
Speeds	2000/3100/4400/7000 rpm
Max dia of tool	160mm

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ITECH DC001S Dust Extractor



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ITECH DC001S 1 Bag Dust Extractor is a ruggedly extractor is designed for small workshops. The industrial construction and quality finish sets it apart from others.

It is big enough to handle a 310mm planer or many other workshop machines. The cyclone filtration system works by separating the waste from the airflow, diverting the waste into the collecting bag. The base is fitted with castors for mobility around the workshop. The 125 mm inlet is fitted with a twin branch 100mm adaptor, allowing connection to either one or two machines. Supplied complete with 1x 3m hose.

Technical Specification:

Fan diameter	300mm
Inlet diameter	125
Inlet holes	2 x 100mm
Air capacity	1490cfm
Bag diameter	500mm
Packing size	920x580x580cm
Motor power	2hp
voltage	240v

ITECH W0501 Oscillating Edge Sander



£1199
inc VAT

The ITECH 501 Oscillating Edge Sander can be used in for getting a superb edge finish, the oscillation reduces marks and scratches free and helps to prolong belt life. The cast iron table combines with a simple rise and fall handle plus an angle adjustment allowing you to use the full area of sanding paper. Mitre fence and slot also included.

A rubber coated drive drum provides positive grip and maximum power transfer. The belt tensioning and tracking operations are a simple and quick process. The sturdy cabinet base includes a storage area for abrasives. The auxiliary table with sanding drum for internal or external shaped work

Technical Specification:

Motor power	2hp
Belt dimensions	2473 x 152mm
Belt speed	1033m/min
Main table dimensions	905 x 305mm
Auxiliary table dimensions	290 x 259mm
Platen tilting	0 - 90 degrees



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David Barron explains how he made his version of the popular Roubo workbench

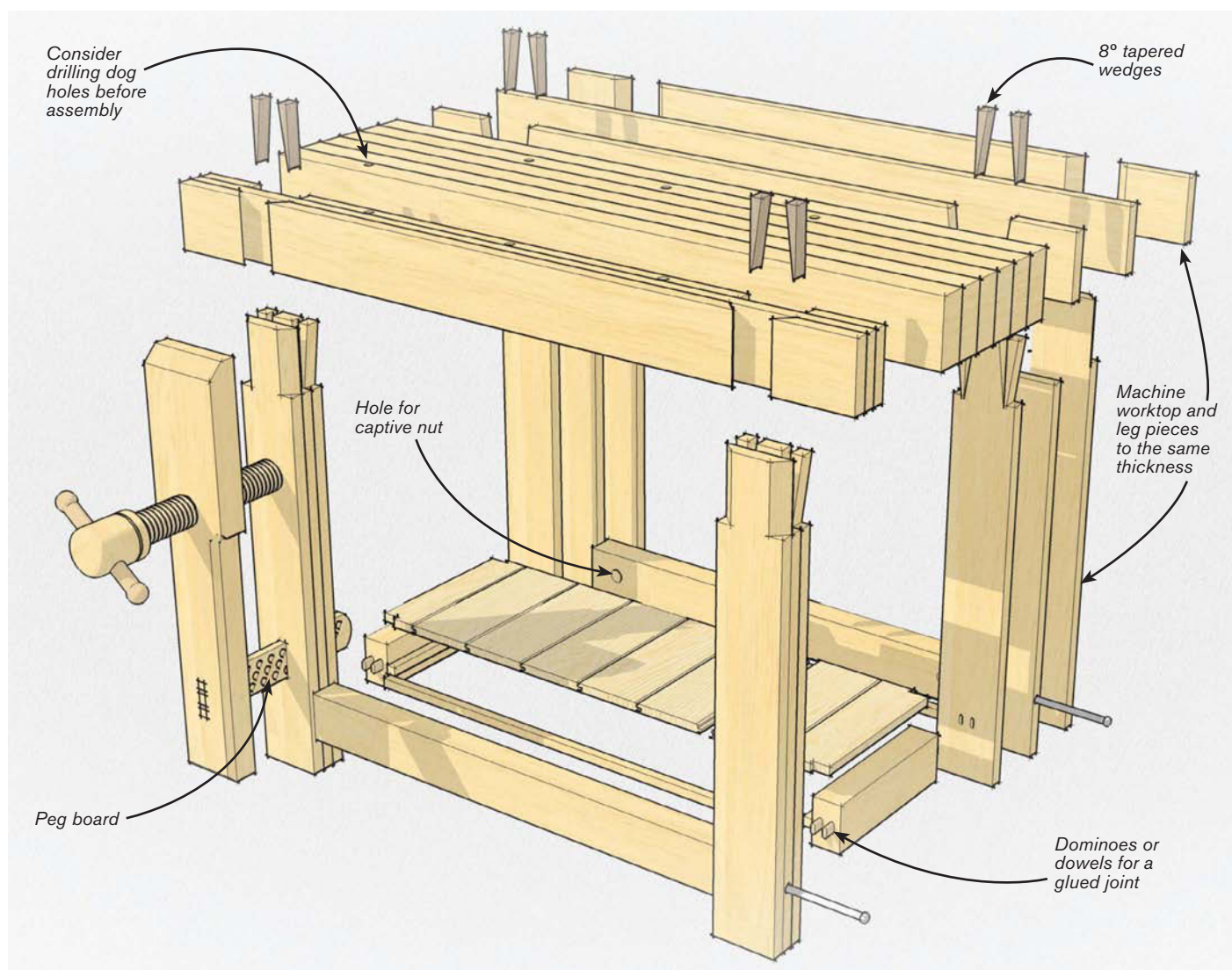
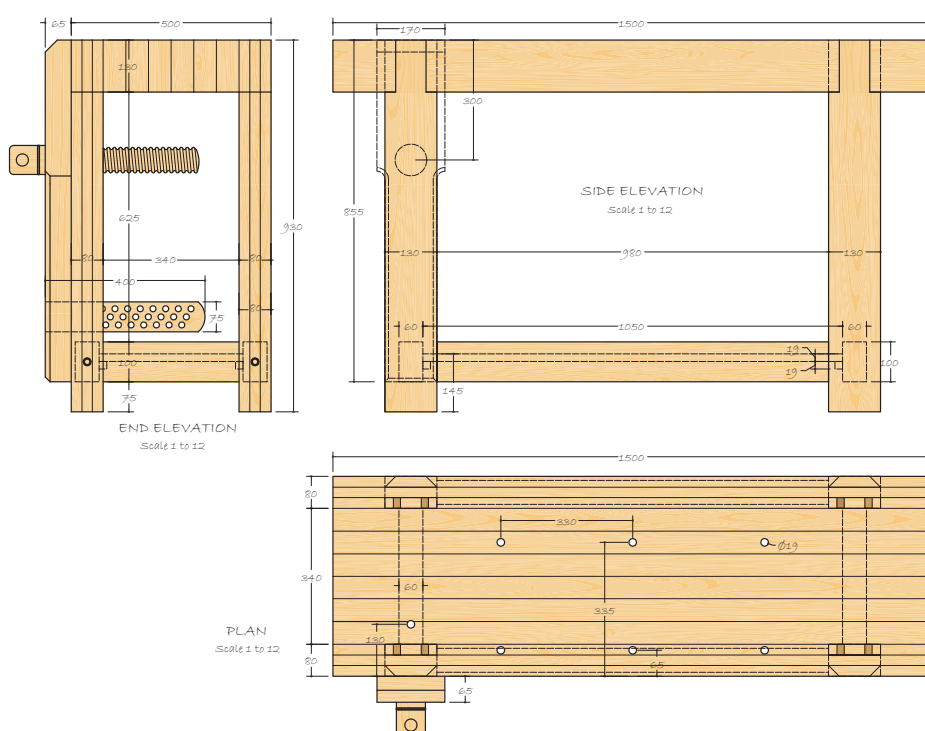
In the last five years, the workbench designed by André Roubo has become very popular, particularly in the US. There is much to commend this style of bench as, with its thick top and legs firmly attached with through tenons, it's as solid as a rock. The leg vice has a great capacity and is certainly a lot better for woodworking than the traditional Record style metal vice. However, building one of these is not for the faint-hearted! Originally, the top would have been one massive board 125 or 150mm-thick, but finding and drying,

yet alone managing a board of this size, is beyond most of us. The other issue is dealing with the massive through tenons, which are more akin to timber framing than fine woodworking. In the building of my bench, I dealt with both of these issues by laminating both the top and legs with thinner boards. The lamination method meant the bench could be any size and thickness I wished and the timber would be easy to buy as well as being properly dry. By making the legs and the corresponding area on the top from

identically thickened timber, the joints can be constructed as you go, avoiding all the difficulty and effort involved in creating them in 125mm-thick stock.

In Roubo's original text, he suggested that any gaps in the joints, as there would inevitably be in 125mm-thick timber, were wedged for extra strength. So I decided that if wedges were needed, it would be a good idea to design them into the joint rather than add them afterwards. This again was made much easier and more attractive using the lamination method. ➤

The 'low fat' version of this Roubo bench can be made with softwood. However, if your work mainly consists of hardwood architectural joinery then you might want to reconsider. If, on the other hand, most of what you make can be carried to the car unaided, it may well suffice. If you decide on the softwood option and can select the boards yourself, try and choose boards without knots. If used on the show faces they will mar the appearance as well as make flattening the top a little harder



Preparation

Beech (*Fagus spp.*) was the chosen wood for this bench and it took four hours' hard work to plane up all the parts for the top and the legs. A quicker and cheaper route would be to use prepared square-edged timber from your local builder's merchant or timber yard. This grade of timber is typically labelled as PAR – prepared all round. It is square shaped but should not be relied upon to be truly square. However, machining it to a fit state for fine woodworking is usually no more than a few passes by hand and even less effort if you have access to machines.

The legs and the corresponding top parts for the beech bench were all finished at 28mm-thick and the central sections of the top were planed to 60mm-thick. Before gluing up the legs the tenons were formed. The dovetail at the front of each leg was cut

at 45° on the tablesaw and finished off with a handsaw. The wedged tenon was cut so that, when spread with the wedges, it was the same width as the dovetail in front of it. The illusion being that the leg appeared to be made from a single piece of timber. I learned the technique of the angled cuts for the wedges during my time at the Barnsley Workshops.

Once the three parts for the legs were done, I used a Domino machine to make sure everything lined up. The wedges were all cut at 8°, which is meant to be the ideal angle, and then they were dry fitted and checked against the mortise side to ensure a perfect fit. They were also cut exactly the same length so that when inserted the same distance they would all be even in the finished joints.



Choose the clearest boards you can and mark them in sequence



Both mortises are created by laminating three sections of timber around the tenons



The dovetailed mortise at the front and the wedged tenon at the back



The wedged tenon needs to splay to the same width as the dovetailed tenon

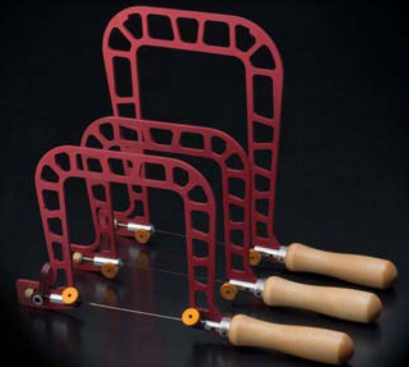


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Assembly

Gluing up the laminations was done one board at a time. It may be tempting to glue some or even all of the boards at the same time, but when you have timber 125mm-thick you're asking for trouble! Once I had the two halves of the top done I jointed the edges again and gave the faces a skim through the thicknesser before final assembly. If you're fortunate to have clamps with soft jaws you might get away without using blocks. If not, be careful to avoid creating depressions in the faces of the corresponding boards.

After the glue had dried, a partial test fit of the legs looked promising and so it was time to cut the thread for the leg vice. As I have a 63mm screw box, I did this straight into the leg, although you would normally attach the 'nut' of the wooden or metal vice to the back of the leg. The wooden screw was attached to the vice board with a *lignum vitae* (*Guaiaecum officinale*) garter and the pegboard was wedged to the jaw in a similar manner as the legs.

So with everything assembled the long rails could be added, the holes for the

threaded rod had been predrilled beforehand into the legs and these were used to guide the drill into the long rails. After this, the wedges were finally inserted to lock everything up tight, taking care to insert them all exactly the same distance to give a neat, even finish. I had intended to glue them in but it was clear that with such a good fit this wasn't necessary, so I left them dry and everything has stayed solid. This just left the dog holes to be drilled for my planing stops and holdfast – no need for a tail vice – and then the Roubo bench was complete.

I have worked on the bench for a while now and there's not much I would change; the top is like working on an anvil and the leg vice is great. If I ever made another, perhaps I'd go 100mm wider and get some help with the lifting!

The bench took 50 hours spread over three weeks, cost £380 in materials – excluding the vice – and weighs about 105kg.

If you would like to see a video of my bench in action, please go to YouTube and search for 'Roubo workbench made easy'.

Low fat Roubo – easier glue-up

Dominoes are a great means of accurately locating components and, in this instance, they offer a slight increase in structural integrity. Dowels or biscuits would do the job just as efficiently and avoid you having to clamp the boards in both directions. Better alignment should result in a lot less flattening when the top is finished



Cut a mortise in the front leg to accept the peg board



Create a wedged tenon in the vice chop to take the peg board

Low fat Roubo – dog holes

If you have access to a pillar drill, drill your dog holes before gluing up. If your Forstner bit won't pass all the way through the top piece, then drill as far as you can and finish the hole with an auger. The bottom of the hole will not be as smooth as the top but it won't matter and it's the top that will be seen. A fine round rasp will help you smooth things out if there's a slight difference in bore size **F&C**



Mark the dog holes with an awl



Finish the holes with an auger

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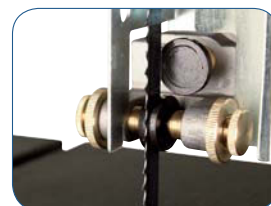
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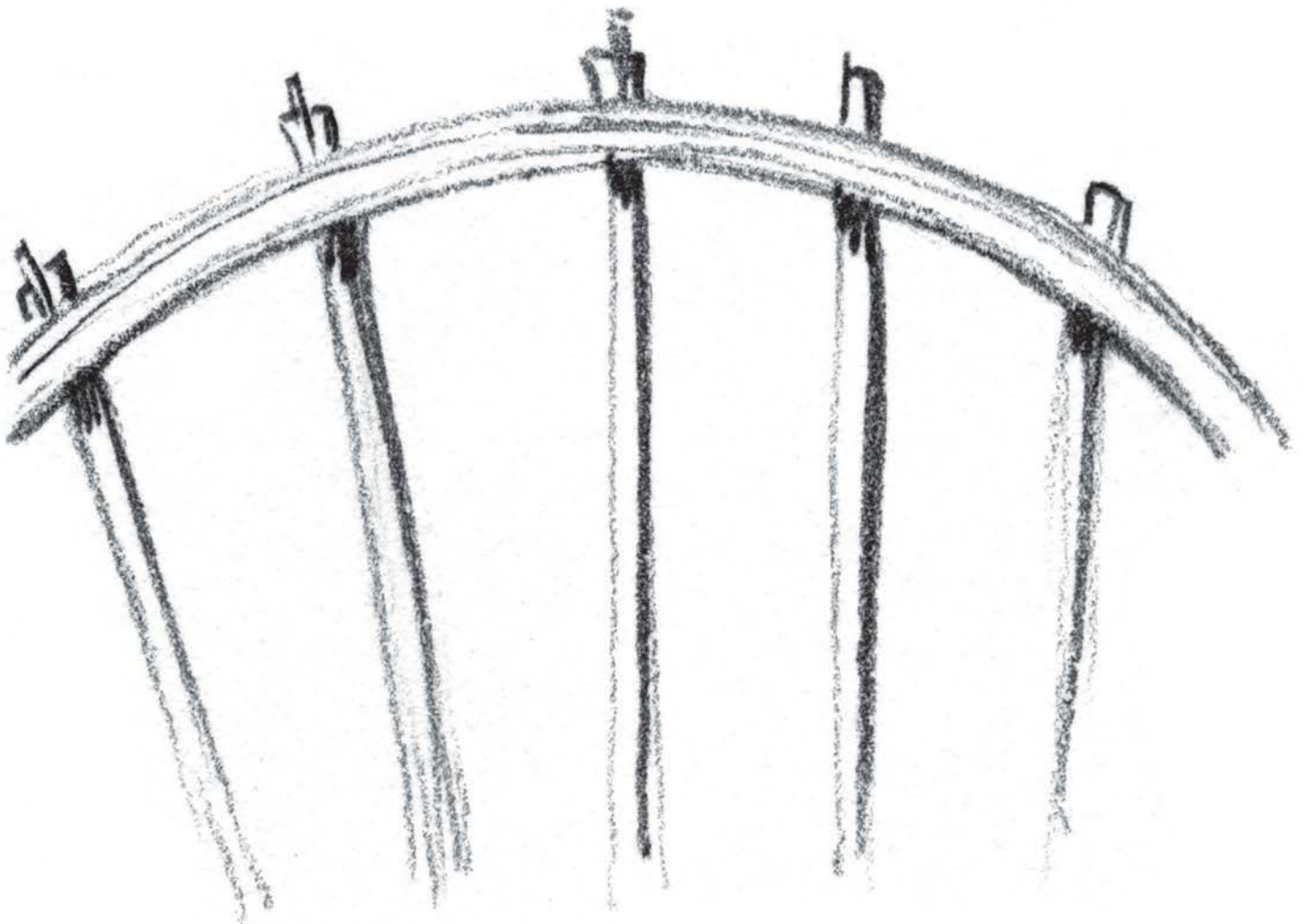
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The chairmaker's notebook

In this excerpt from *Chairmaker's Notebook*, Peter Galbert looks at joining the chair components and the various steps you need to consider

Once you've learned to pull the parts from the log and shape them, joining them together is the next step to creating a successful chair.

Like any load-bearing structure, chairs balance the strength and flexibility of the material with the size and shape of the joints. Unlike tables and cabinets, chairs must withstand forces in multiple directions. When a person plunks down in a chair and starts shifting about, the stresses reverberate throughout the structure. A Windsor chair is akin to a bridge or a hammock, wherein flexible parts with a high tensile strength disperse stress across many joints. More

than the strength of any one part or joint, the real success of the Windsor is the design that allows the joints to support each other in a flexible yet sturdy web.

While I enjoy my time shaping parts until they please my eye, when it comes to the joinery, I strive for all of the accuracy I can muster. The longevity of the chair demands it.

Making chair joints

When I worked in furniture and cabinet shops, much of my time making joints was spent setting up machines. Once a machine was set, I could run one or 1,000 parts with

the same results. Of course, if the machine setting was a hair off, I had one or 1,000 poorly sized joints, so I spent a lot of time fiddling with machinery rather than working wood. This way of working suits mass production and accuracy, but looking back, it seems like I was more of a machine operator than a woodworker.

Making chair joints is different. For instance, each leg is fit into a mortise in the seat, then those parts are forever assigned to each other. This might seem foreign or inefficient, but it is actually a fast, effective way to work, and it limits the telegraphing of errors throughout the chair. In a factory, with

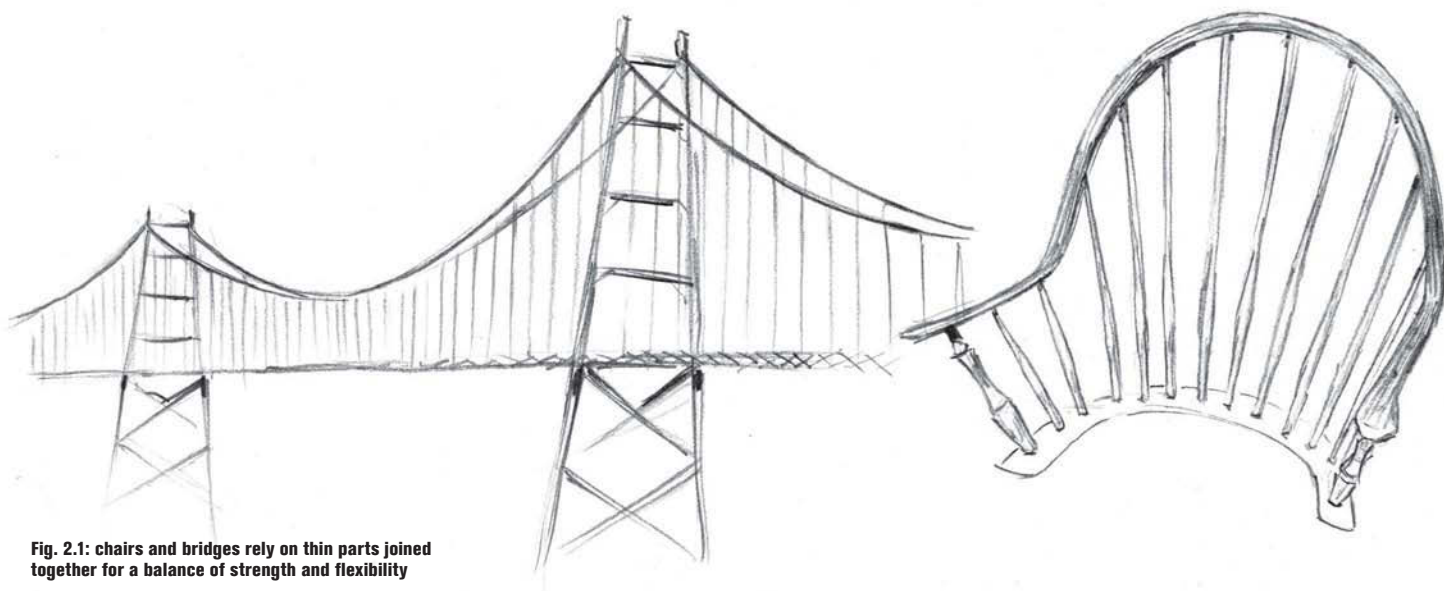


Fig. 2.1: chairs and bridges rely on thin parts joined together for a balance of strength and flexibility

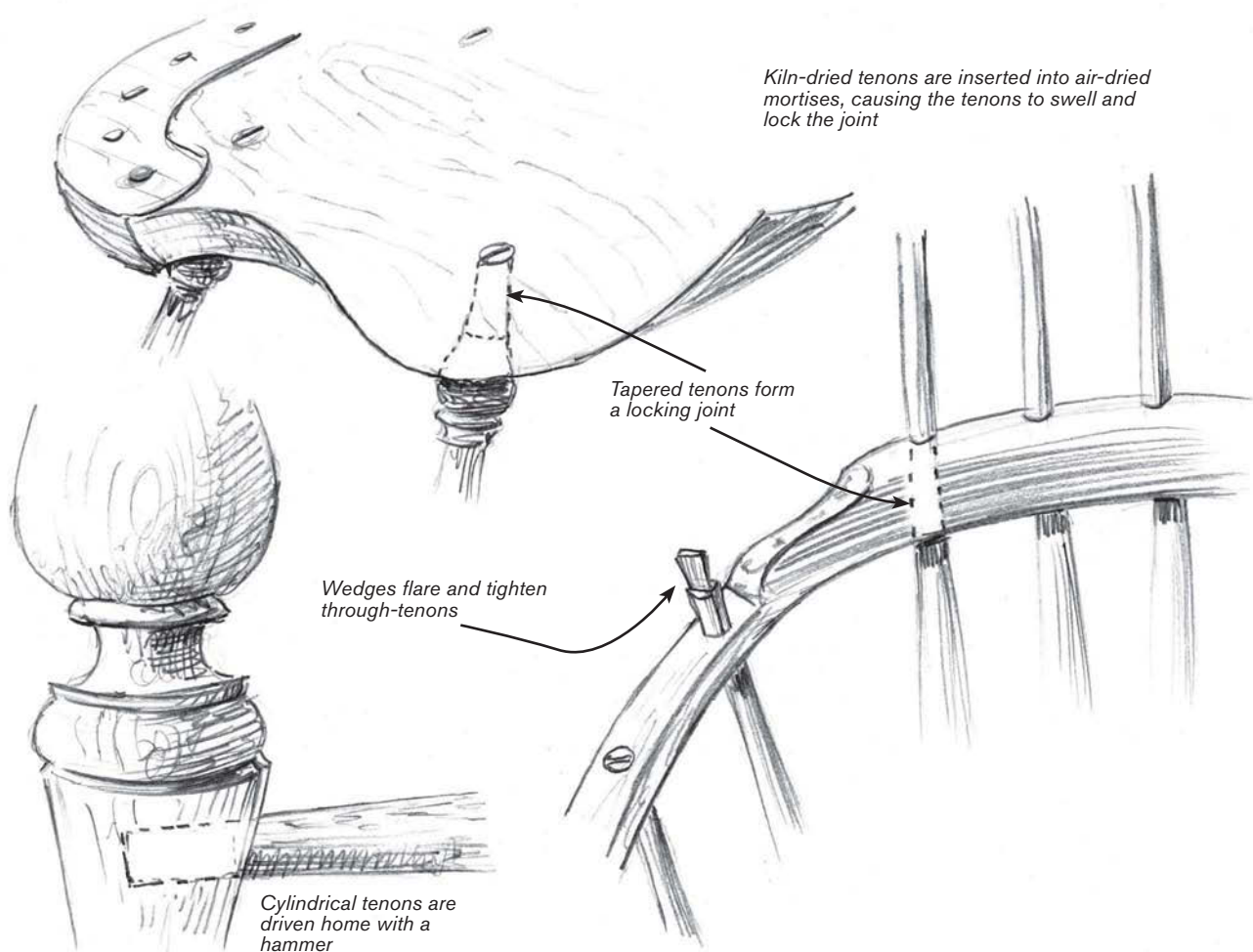
designs set in stone and a large investment in tooling and process development, there would not be an advantage to this, but it suits the small shop beautifully.

Instead of trying to make each part fit numbers on a drawing, I make it to fit the chair. The same goes for the lengths of many other chair parts. The priority is that the part fits the chair, not the drawing. So measuring the exact length of a stretcher

based on the distance between the legs gives great results, even if some previous steps were flawed.

With any joint, the first consideration is the strength of the species used and the sizes of its components. When parts are selected for their strength, split from the log, properly joined and supported by other joints, the overall size of each joint can be surprisingly small.

It's also important to note that tools cut different species of wood differently. A hole drilled in a dense wood generally comes out smaller than a hole drilled with the same bit in a soft wood. It's a mistake to assume that a tenon at exactly .5000in will fit a 12mm hole bored into white pine, especially with a vibration-prone drill. The softer wood will give the bit just enough of a chance to move so that the hole may be larger and the joint loose.



Kiln-dried tenons are inserted into air-dried mortises, causing the tenons to swell and lock the joint

Tapered tenons form a locking joint

Wedges flare and tighten through-tenons

Cylindrical tenons are driven home with a hammer

Fig. 2.2: a basic rundown of the joints common to Windsor chairs

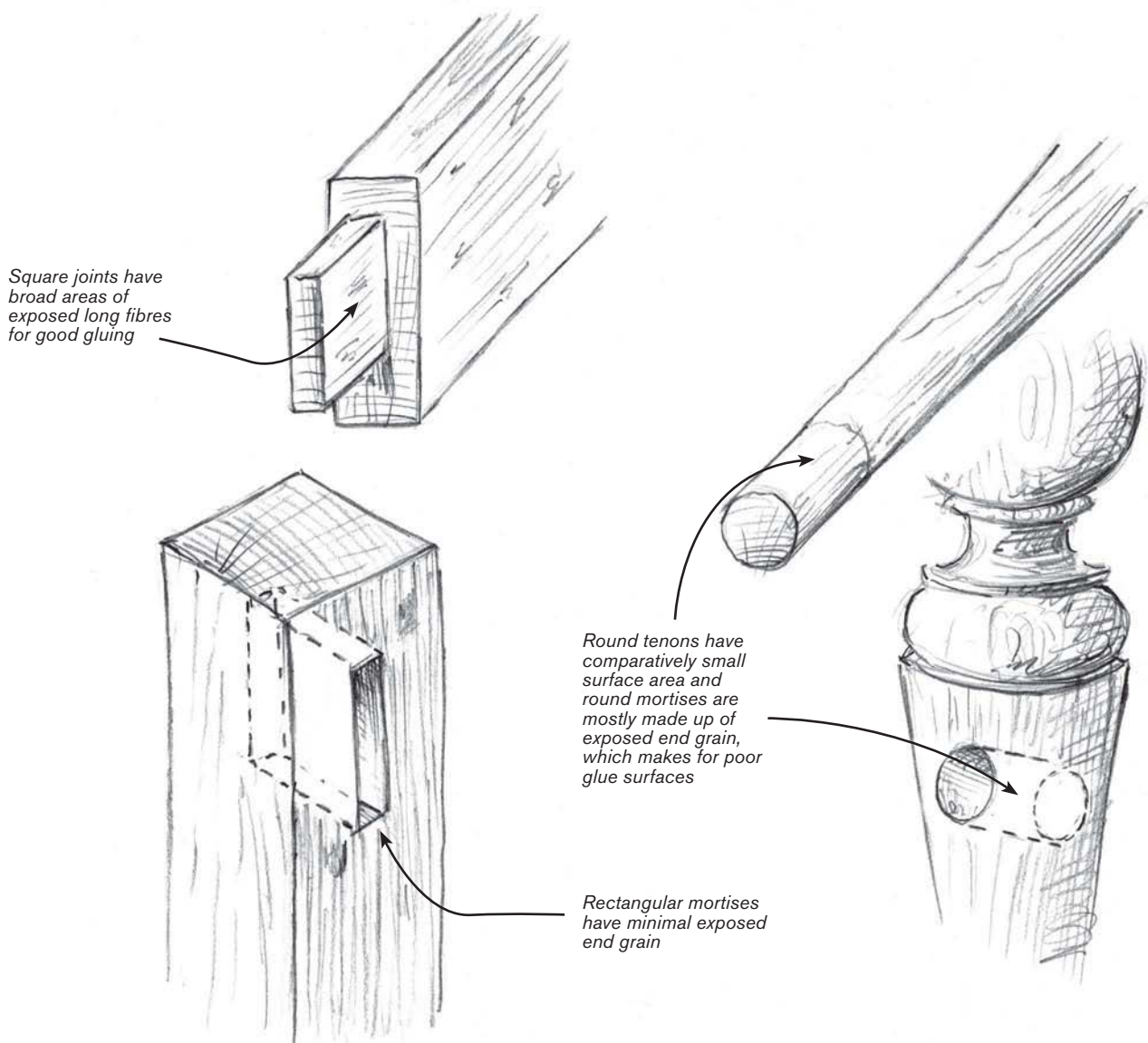


Fig. 2.3: a comparison of the glue surfaces between round and square joints

Humidity shift

Another problem that can wreak havoc in production-style work is a humidity shift. Sure, you can cut dozens of tenons to within a couple of thousandths of an inch, but the next day, after a shift in humidity, you have dozens of tenons that don't fit. When making a chair, I don't have this problem because I control the tenons' moisture by drying them in a kiln before sizing them, then I make sure they are in the kiln for at least 24 hours prior to assembly.

When joining pieces of wood together, there are many variables. The size of the good gluing surface goes hand in hand with the tightness of the joint. The best glue surfaces are had by joining long-fibre sections together. Any end grain in the joint does not add significant glue-bond strength to the assembly.

There are a number of joints in the chairmaker's arsenal, most of them based on a round tenon and mortise. Round joints are easy to make with simple tools. Plus, boring a hole at an angle is simple, which suits chairmaking. On the downside, however, round mortises are largely made up of end grain and are poor glue joints when

compared to the broad expanses of long grain fibres in square mortises.

To make up for the paltry glue surface and the intense stresses that they suffer, chair joints must be tight – so tight that full test-fits of the undercarriage should be impossible. For instance, the joints between the stretchers and the legs should only fit about one-third to one-half of the way in during a test-fit.

There are other portions of the chair that require the joints to be tight enough to hold but loose enough to assemble. When assembling the top of a chair, multiple joints need to come together at once, and while the joints should by no means be sloppy, they must slide into position in unison. The goal is that they should slide together without squeaking, which means they are too tight, or rattling – too loose.

Tapers

Another way to gain strength and to ease assembly is to use tapered mortises and tenons that lock into final position. Tapering a tenon and reaming the mortise to fit creates a locking joint, as can be illustrated by the

Morse taper used in machinery, such as lathes and drill presses. Tapering a mortise and tenon is simply one step beyond making the joint with cylindrical parts. The tapering process offers a chance to refine the angle at which the mortise was drilled and makes assembly easier because the joints don't lock until they are completely inserted.

The angle of the taper that works best is below 14° inclusive, which is the range where it forms a mechanically locking joint. I prefer a 6° taper angle.

Wedges

One option to tighten the joints is to wedge the tenons where they pass through the mortised part, such as where the short spindles pass through the arm and where the legs pass through the seat.

On some joints that suffer forces from multiple directions, I adjust the mortise to create a locking joint. Use a file to remove material from the mortise where the tenon will exit, removing only enough wood to create a gap slightly more than the diameter of the tenon and only on the end grain portions of the mortise. The inserted

wedge then flares the tenon and creates a mechanical lock that prevents the tenon from retracting in the mortise. This is the same joint used to secure handles in hammer heads. I don't flare the mortises in seats for the leg joints because there is no upward stress on them, and the weight of the sitter keeps the tapered joint solid long beyond the life of the glue.

On joints that have little surface area, such as where the tapered tenon on the top of the arm post passes through a thin arm, I opt to use two wedges to better distort the tenon into a flared lock.

It's important to plan for seasonal movement in any joint. When gluing in the wedges, I apply glue to only one side of the wedge. This allows for a

gap to open next to the wedge when the tenon shrinks during seasonal movement. By directing the stress to a harmless spot, you protect a more vital part of the joint. If both sides of the wedge are glued, seasonal shrinkage of the tenon might cause the tenon to pull away from its mortise wall, weakening the joint.

Moisture content

Another aid to making tight joints is to manipulate the wood's moisture content – especially helpful where the stretchers enter the legs, because they are 'blind' joints and can't be wedged as easily as through-tenons. The so-called 'wet/dry' method is especially suited to chairmaking, although I think it is better described as the 'dry/super-dry' method because no part of the joint is actually 'wet'. When a correctly sized, super-dry tenon is driven into an air-dried mortise, the tenon will draw moisture off the mortise and swell, locking it in place. If the mortise is too wet, the tenon may swell excessively, damaging the surface cells of both parts. I've tried oversizing the tenon for these joints by a few thousandths of an inch, which works great, and lots of chairs made this way have withstood the test of time without glue.

Most of the time, I size all of my 'hammer-fit' tenons as exactly as possible to the mortise. When this is done correctly, I can push the tenon into the mortise about one-third of the way before it seizes and requires a hammer or mallet. This is helpful during assembly, and I am confident that once the moisture equalises, I'll have a long-term joint.

I have rarely gone so far as to concern myself with measuring the actual moisture content of parts. Instead, I've relied on the temperature of my kiln, which I keep anywhere from 49-60°C. At this temperature, I am certain that when my parts stop shrinking and losing weight, they are much drier than the ambient moisture of my shop where I keep my air-dried parts. I simply observe the wood as it shrinks in its environment and follow a few simple rules.

One such sticking point is the timing of the drying and assembly. One comparison is to say that a tenon is to a kiln what an ice cube is to a freezer. You wouldn't take an ice cube out of the freezer to put into a drink tomorrow, or even in a few hours. Also, a tenon must be fully dried in the kiln before being finish-sized and then stored in the kiln for a day or so before assembly to ensure that it doesn't swell prematurely and make assembly go awry. That being said, there is lots of room for leeway and human error as long as the basics are observed.

I also like to leave fresh green wood that has been shaped into parts outside to air-dry for a few days, to avoid shocking it and potentially checking it. The need for this varies by species. I always err on the side of caution when pushing the wood to dry faster. This is one of those times where a little experience – and some failures – can make up for scientific accuracy – and failures.

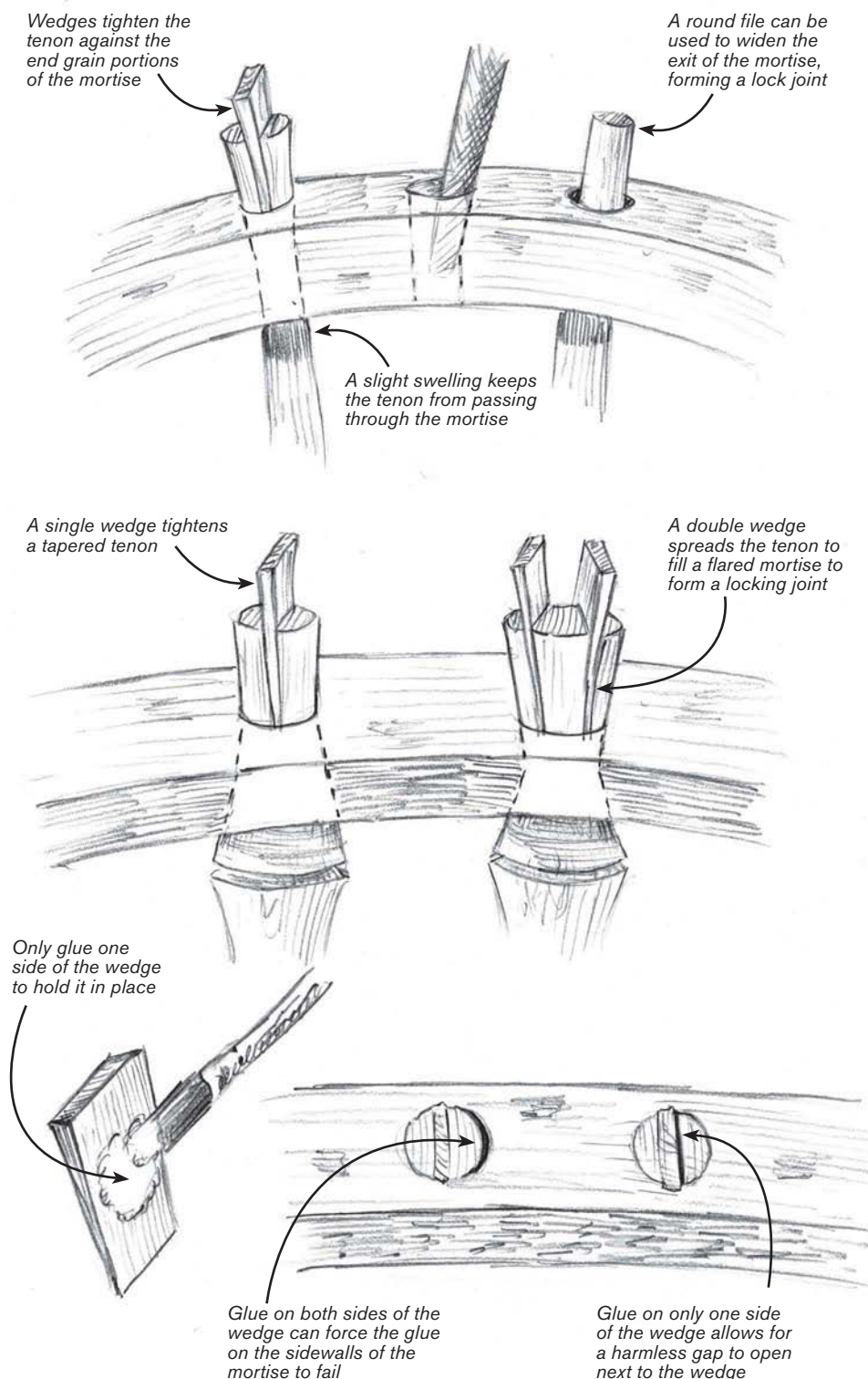


Fig. 2.4: wedging makes for a tighter joint than you could hope to fit together

Orientating tenons to mortises

Beyond the initial equalising of moisture in the joint, seasonal moisture differences will also cause wood to move throughout its life. The tenon must be carefully orientated to harmonise the movement in the mortised piece. This can take a bit to wrap your head around. It's easy to confuse which part is the variable here. Basically, the hole – mortise – can go into a piece of wood anywhere without regard to whether it is in the tangential or radial plane. The critical factor is the rotation of the tenoned piece to make sure that the parts move in relative harmony. When you are looking at the mortised piece, you should only be concerned with the direction of the long fibres. The seasonal movement of a piece of wood along its

long fibres is negligible. With this in mind, the goal of orientating the tenon is to make sure that the direction that the tenon swells the most is the same as the direction that mortise moves the most.

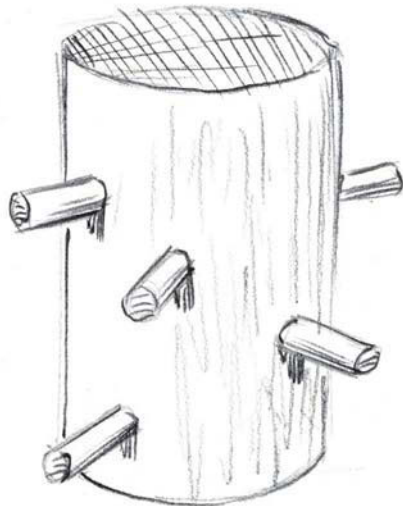
In other words, if the tangential plane of the tenon, which moves the most, is rotated parallel to the long fibres of the mortises piece, which don't really move seasonally, the tenon will get permanently compressed by swelling against the end grain of the mortise. This is a recipe for a loose joint.

One way to remember which way the tenoned piece is going to move the most is to look at the rings on the surface of a workpiece and imagine that they change shape seasonally. What you see now as an oval will

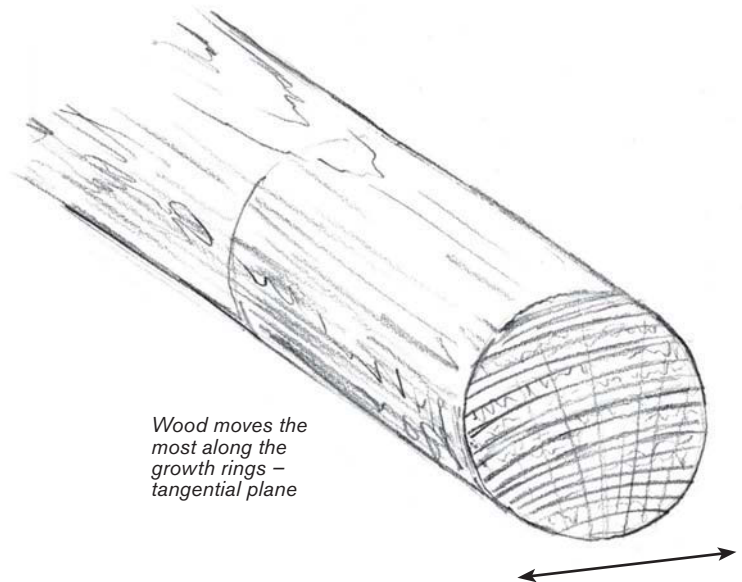
become a circle in the summer. This overstates the reality, but it might help you remember which is the significant plane of movement.

The simple rule of thumb is that the growth rings on the tenoned piece should never be parallel to the long fibres of the mortised piece. I know from teaching this over the years that it can seem daunting. Keeping straight which piece to look at to determine the rotation of another can be confusing the first time through. I focus on which piece of a joint has a tenon, then I rotate that piece so that the growth rings are perpendicular to the long fibres in the mortised piece. Running through it a few times and then comparing your rotation to the images here will help set the priority.

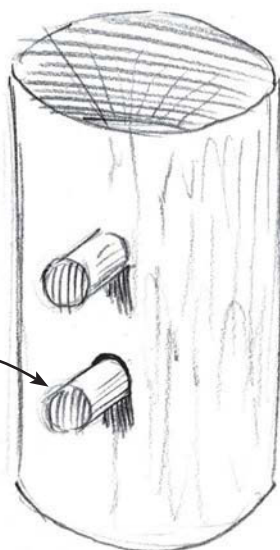
Mortises can be drilled into a piece of wood in any plane; it is the rotation of the tenons that is critical to the longevity of the joint



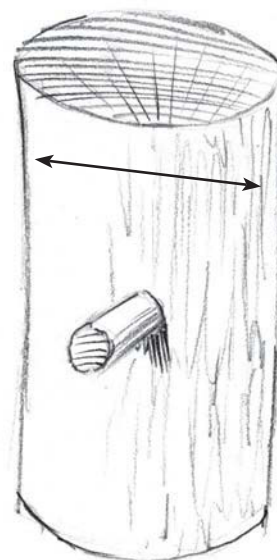
Wood doesn't move significantly in the direction of the long fibres



Wood moves the most along the growth rings – tangential plane



When the growth rings of the tenon are parallel to the long fibres of the mortised piece, the tenon swells against the end grain of the mortise and compresses, causing failure



Orientating the tenon so that the tenon moves perpendicular to the long fibres harmonises the movement of the parts

Fig. 2.5: how to rotate the tenon to keep the joint tight

Glue

There are plenty of choices for glue to use when building a chair, but my first consideration is that my chair should stand without it. My first close-up experience with a properly made chair was with one that was left behind in my New York City apartment when I moved in. It's a sweet little factory-made side chair with some decorative painting that was clearly done by the previous owner trying to dress it up. I enjoyed sitting in it for years, and then one day, I lifted it up by the rear posts and the top came apart! I put it back together and it sat just fine. This piqued my interest, and I started looking into chairs that didn't rely on glue to hold them together. I suppose this was the nudge that pushed me into making Windsors. Many of the joints are made so tight as to not need glue, especially those in the undercarriage. And some joints, such as the tapered leg joints, are designed to resist the force of the sitter and actually tighten under your weight if the glue fails. To my way

of thinking, glue should be an afterthought to the design and execution of the joinery.

That said, of course I use glue, but my decision reflects a number of factors. I use hot or liquid hide glue in my chairs mainly because it is the only glue that is both cohesive and adhesive, meaning it will stick to other things and, more importantly, to itself. This means that I can repair a loose joint by introducing a little heat, moisture and fresh glue. There is some confusion about the term that is most often used to describe this characteristic: reversible.

Yes, you can unseat a joint that has been bonded with hide glue by applying heat, moisture or both, but that isn't the idea with chairs. For instance, I can imagine a loose joint where a spindle passes through the arm bow, but I wouldn't fix it by trying to unseat all the supporting and connecting joints, just to get inside the loose joint. If the chair was well made, it just won't happen. But wiggling the loose spindle a bit to work in some fresh hide glue is quite simple.

Another factor that I prize is the freshness of the glue. If I use dry flakes and make the glue myself, the flakes will last virtually forever, and I can mix up just enough for the chair that I am building. If I am using liquid hide glue, I purchase it from a company that tracks its freshness. When I buy a new bottle, I immediately pour it into a plastic zippered bag and place it in the fridge. I pull

out small portions of the cold-gelled glue as needed, heating it to 24°C or so until it is liquid again. I can store gelled glue like this for a year in the fridge.

The first response that I get when I mention hide glue is usually: "Doesn't hide glue stink up the shop like roadkill?" I'm happy to say that the answer is no. Fresh glue has a distinct smell, especially when heated, but it isn't unpleasant. I heat hot hide – and liquid hide glue – when the temperature of my shop is below 24°C.

Hide glue is basically a food product, and if you were to leave any food product constantly or repeatedly warming on a heat source in your shop, it would stink. But the bad smell isn't the reason to avoid constant heating or reheating. The reason that I mix fresh stuff up and only reheat it a couple of times is that its bonding ability breaks down with repeated heating.

I test my glue by putting some on my fingers and pressing them together. After a few seconds I pull them apart. If I see a bunch of web-like filaments fly away, I know that it has bonding strength. Much has been written comparing the strengths of different glues, but when properly used and applied to clean, unburnished, non-oxidised joints, they are all stronger than the wood, so a published strength test is not my greatest concern.

Even premixed liquid hide glue can benefit

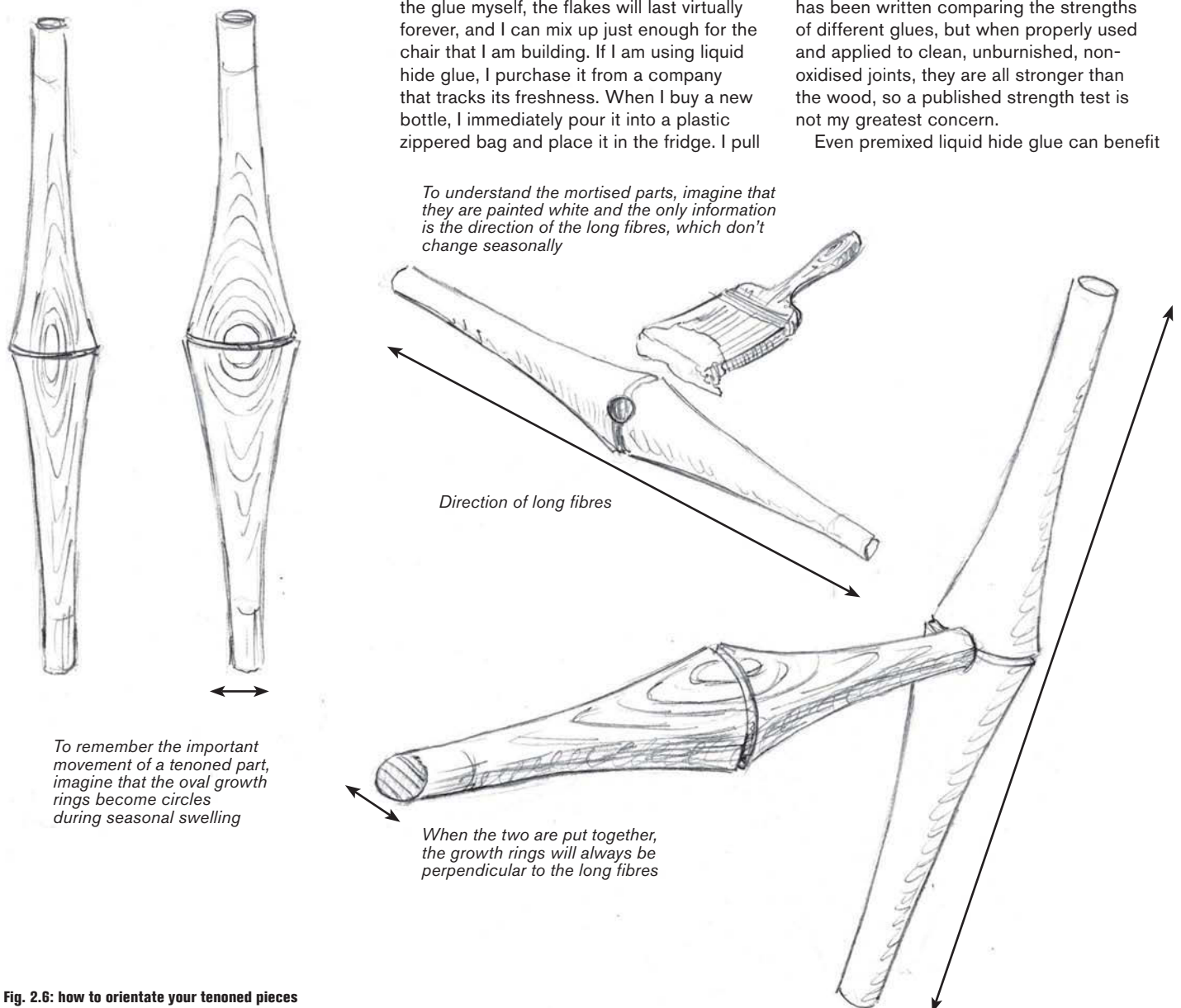


Fig. 2.6: how to orientate your tenoned pieces

from a heat source if the shop is cool. While there are pots made for keeping glue at a consistent temperature, a cheaper solution is simply a pot of hot water or an electric pot filled with water – be sure to keep the glue container off the heating element. I set the heat to the lowest setting, using a double boiler to gently heat the glue when I need it. A bamboo skewer through a plastic cup suspends the cup in the water and is a handy place to tip the excess glue off of the brush. The hot water in the pot also helps with clean-up. Be careful not to boil the water and the glue; that will break down the proteins that make up the glue's bonding strength. Keeping a glue pot heated constantly makes sense if you are in a large shop and have many workers dipping into it, but for me, a small bit of glue, heated when I need it, is more efficient.

Another plus in the hide glue column comes during assembly. Often, a glue manufacturer will list the 'open working time', which is basically the time that the joint can sit unassembled before the glue starts to set. But during the assembly of tight joints, these same glues – namely aliphatic resin, or yellow glue – can cause the joint to seize under pressure. This can lead to a hectic glue-up or split parts due to the added force needed to free the bond of a frozen tenon. Hide glue, mixed to the right consistency, acts almost as a lubricant and helps the joint slide together. Some of the major yellow glue manufacturers are in the liquid hide glue market, but I've found that their glues have some of the same issues as yellow glues, namely fast-setting and tacking.

The other response that I get is usually: "But isn't it a pain to mix up?" Again, no. A few proportions and a little forethought make the job simple. Following the manufacturer's instructions is the best way to be sure that you are using the glue properly. The usual method for mixing hide glue is to soak an amount of glue in cold water overnight. You will be amazed at how much water the glue can absorb. Then melt the mixture in a double boiler and strain it if necessary before using.

Just like with my liquid hide glue, I store the majority of my glue in the fridge and take a small portion, about the size of a couple of ice cubes, out to use. When I am done with the chair, I generally pitch the remaining glue in the compost.

Another advantage of hide glue is that you can slow the set-up time with additives. Urea, commonly found in fertiliser departments in nursery stores, will retard the set-up time, so will table salt. Add only as much as you need to keep the glue workable for your needs and no more. I've read that you should never exceed more than 20% – by weight – of additive to glue.

One of the greatest assets of hide glue is that it cleans up with warm water – forever. You can go back to a dried glue spot years later and soften and remove it with heat and moisture. To find glue spots, I employ a UV flashlight that takes advantage of the glue's natural tendency to fluoresce. When the light



Fig. 2.7: glue pot options: premixed liquid hide glue, a dedicated glue pot – centre – and an electric pot – right

shines on a glue spot, it glows green. I've even added a drop of UV-responsive dye to my glue to make sure I can spot any residue. Cleaning up glue is important because it can prevent milk paint from sticking. And if the chair is to be unpainted, the glue will prevent the spot from oxidising with the rest of the chair. So months or years later, the glue spot will be quite evident.

Doesn't hot hide set up too fast to glue up a chair? Well, it depends on the temperature in the workshop, the temperature of the parts and the amount of retarder that you have added. Usually in the colder months, I use liquid hide glue, which already has as much retarder as you would want to add. I make sure the shop is as warm as I can get it; above 21°C is ideal. Keeping parts in the kiln or heating them prior to assembly with a hair-dryer or heat gun can slow the setting time as well.

The other glue options are white glue, yellow glue and epoxy. My only problem with white glue is that there is no simple way to repair the joint. Many chairs have been re-glued only to give way a few weeks later, and that's because the only way to re-glue a joint glued this way is to separate the parts and remove all of the old glue. And scraping the joint components will most likely be of no service to the fit of the joint!

As I mentioned, yellow glue has a bit of a nasty disposition when the joints are hammer-fit tight. Epoxy can adhere to itself, but I don't want to spend my days mixing it up, and its stability over time is still a question in my mind. Glue is a tool and my choice is influenced by the same process as with all of my tools. I assess the history, longevity and ease of use. Which glue you choose to use is probably going to be a mix of availability and your comfort level with it, but I recommend trying liquid hide glue; I have had the most success with it.

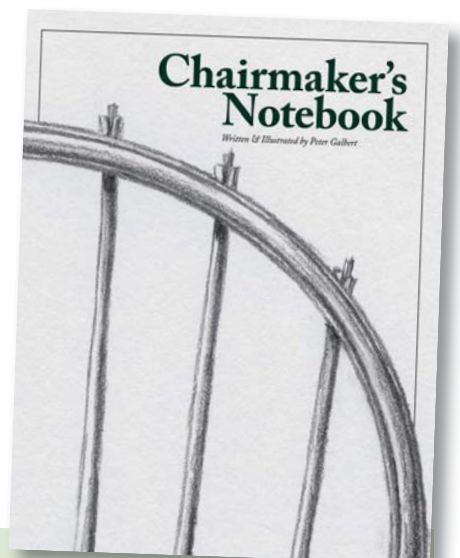
Conclusion

I've made lots of furniture and cabinetry. For the most part, I have been more impressed by the machinery used to cut precise joints

than the ingenuity of the joints themselves. I prided myself in figuring out the most accurate and fast way to make the joints and figured that the joints were usually a base for the glue to hold the pieces together.

When building chairs, what inspires me is the simplicity of the joints and the way that they lock the parts into the structure. Building a chair without glue helped me to think differently about the potential of these joints, and now I build every chair with a focus on joinery that reduces the dependence on glue.

I feel akin to a basketmaker, knowing that a web of thin pieces, properly linked, takes full advantage of the properties of the material and results in a product of exceptional comfort and durability. *F&C*



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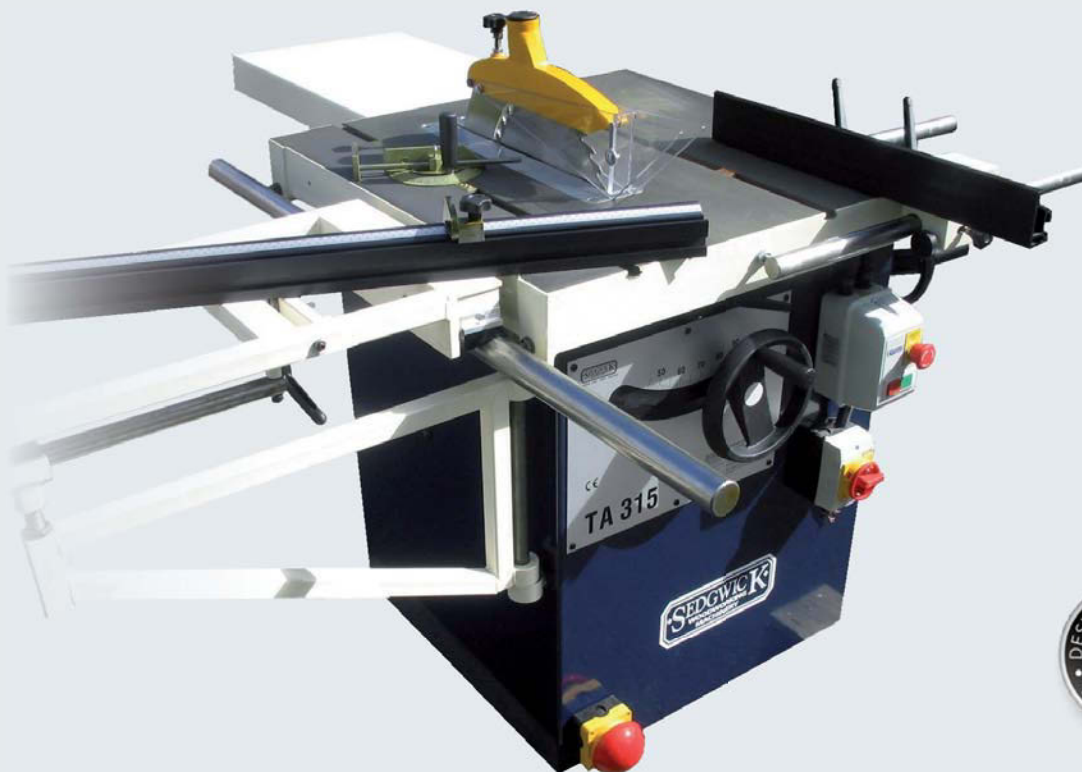


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Making a three-way mitre joint

The secret to making this intricate, striking corner joint successfully is, as always, to choose the right tools for the job and to follow a few proven techniques, as Charles Mak demonstrates

When none other than Tage Frid wrote: 'A three-way 45° joint... is very difficult to make', we can understand why most woodworkers shun it in their projects. What makes this simple-looking joint so difficult is the high degree of accuracy it demands during every step of the joining process from dimensioning to mitring to mortising. Even the assembly can be taxing.

Your choice of tools really does matter if you want to cut this joint. Some woodworkers, including Frid, use a tablesaw with a mitre sled to cut mitres. It often requires different settings and readjustments to make the double-mitre cuts and any

inaccuracy compounds upon itself with each subsequent adjustment and cut. For cutting the mortises, many turn to a router and a shop-made jig. Even if the jig is well designed and built, the mortising process is often slow and time-consuming, if not less than precise.

So, is there a better alternative? Forget about the tablesaw; use a tuned-up mitre saw to cut double mitres – it is what a mitre saw does best. To cut loose mortise and tenon joints, it is hard to find a tool that offers better accuracy, speed and simplicity than a Domino joiner. Buy or borrow one if you want precision results in your first three-way mitre joint project.



The complex form of joinery makes this simple frame a challenge to build



A three-way mitre joint is also called a Parson's joint

Preparing the stock

The success of a three-way mitre joint begins with meticulous stock preparation. I checked every piece – the stiles – legs – and the rails – for squareness and straightness. After cutting the stock to length, I planed off the machine marks.



Make extra pieces and discard or fix stock that is not up to the requirements



To cut stock to exact length, use a stop block and clamp the piece down



Remove the machine marks with a hand plane set for the finest cuts

Mitre saw setup

The first step, often conveniently omitted, is to check that your mitre saw cuts flawless mitres. Make test cuts and adjust the saw, if necessary, until your saw can cut perfect mitres. Being close enough is not good enough for this kind of joint.

Marking before cutting

Trying to cut all the double-mitres without a plan is unwise and error-prone. You could treat, for example, a stile as a rail and mitre both ends, or cut a joint on the wrong face of the workpiece. To avoid such cutting mistakes, start by labelling the rails and stiles and marking the end(s) where the double-mitred joints will be cut.



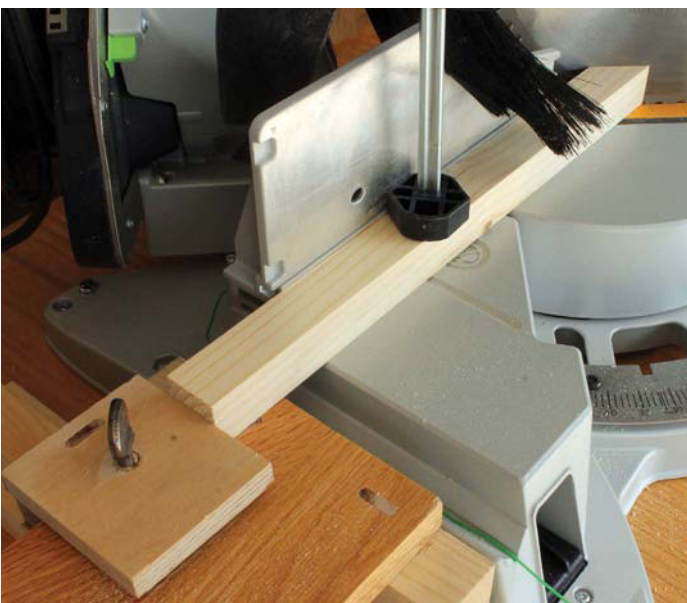
Workpieces all look the same and without proper marking, mistakes are waiting to happen. Discard any with faults that could affect the joint



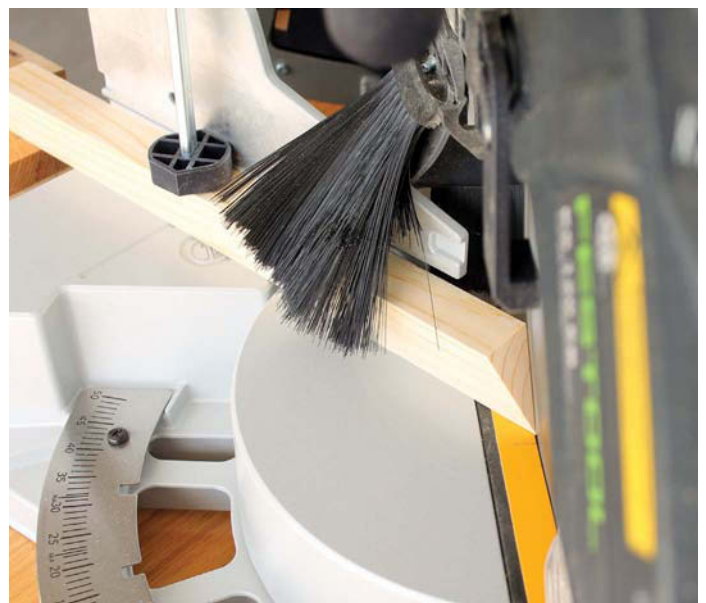
Mark all the pieces with a clear method of identifying each component for its place in the project and orientation for mitring mistakes

Cutting the mitres on the stiles

Hold the first stile against a stop block and cut one end to 45°. Then turn the piece so the bevel faces up and make the second cut to form a double-mitre. Finish all the stiles in the same manner.



Clamp down the stock to prevent any slight movement during the cut



Rotate the piece towards you so the bevel faces up and make the second cut

Cutting the mitres on the rails

In a rail, both ends are double-mitred. Cut the first end as described previously. Cutting the second end, however, is trickier as the sharp mitred end can be too fragile to register accurately against a regular stop block. Adapting from an idea used by furniture designer and

teacher Ian Kirby, I made a bevel stop block to capture the mitred face as the registration point. Once the sharp end is clamped against the bevel stop block, proceed with the mitring steps as before. Finish the rest of the rails the same way.



Make a bevel stop block by gluing a mitred offcut to a temporary fence



Butt the mitred end against the bevel stop block to cut the double-mitre on the other end

Cutting the mortises

In *F&C 233*, I covered the setup and operation of the Domino joiner. For this project – rails and stiles of 27 × 27mm – I used the 4 × 20mm tenons and set the machine to cut in the standard mortise width at a fence height of 6mm.

The last setup decision to make was where to put the mortises. The closer the mortise is located to the inside corner of the joint, the

stronger the joint is. The narrow stock, in this case, required the tenons to be placed close to the inside corner so that they did not overlap – the mortise line was set at 26mm from the sharp point. The sharp point made it difficult to measure and accurately mark the mortise locations on all of the pieces. A V-block solves the problem. Once marked, clamp the workpiece on the bench and cut the mortises.



Glue two mitred offcuts on a board to form a V-shaped marking block

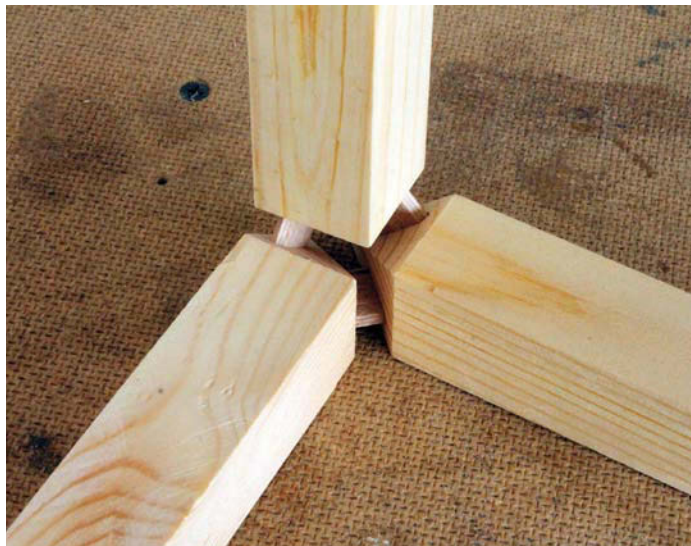


Group the workpieces and cut all the mortises

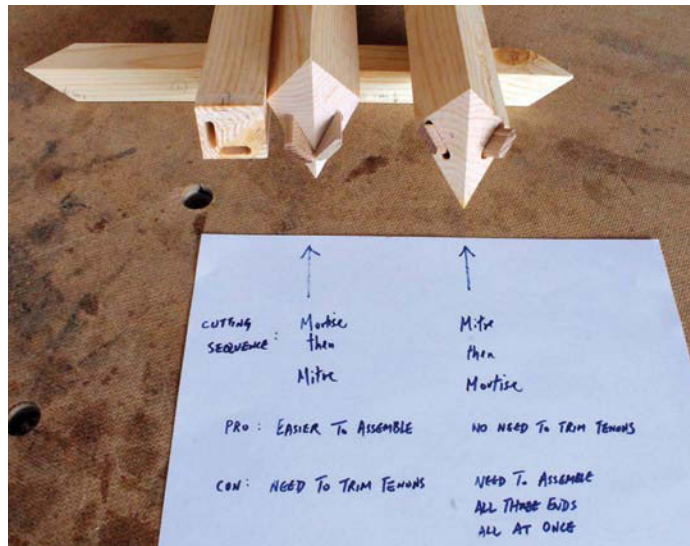
Assembling the joints

If you cut the double mitres first – a procedure we use here, the Domino joiner will cut a mortise perpendicular to the mitre. The three pieces are assembled all at once.

Another approach is to cut the mortises first and then mitre the ends. Under the second approach, the mortises are parallel to the stock. That means you can join any two pieces first and then add the third piece, making the assembly process easier.



Open up the joint and wiggle the stile into the pocket



After the mortises are mitred, they will only accept tenons that are trimmed shorter



Cam clamps with their non-marring, cork-faced jaws are ideal for clamping this type of delicate surface



Plane everything smooth and flush with a freshly honed edge

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PHOTOGRAPHS BY KIERAN BINNIE

Luthier's gluing jig

Kieran Binnie looks at making a jig for clamping thin stock

Over the years, *F&C* has acquired readers from all four points on the compass and since going digital in 2013, that trend has increased. You can find us anywhere in the world with a link to the web. As the content of the magazine is a true reflection of our readership, we've decided to introduce a new style of article that will take us on a workshop tour of the globe.

Our reporter this month is luthier Kieran Binnie, who wrote for us in issue 230 on the benefit of lutherie techniques for furniture makers, as well as the importance of parallel skills back in issue 227, and mostly recently, on the subject of community in woodworking in issue 232. Here, he goes back to discussing luthiery and talks us through the making of a handy gluing jig.

A great deal of the luthier's craft is spent working with stock far thinner than that commonly used by most furniture makers and gluing up thin panels of say, 5mm thick, requires a different approach – which I wrote about in issue 230. Of course, the use of thin stock is not exclusive to the lutherie workshop and here I will describe how you can build this jig for your own workshop.

In essence the gluing jig is a slotted deck with rails on two sides – each of these sides has a rail above and below the deck. The rails on one side are fixed, while the other set moves to accommodate the width of the panel being glued. Clamping force is provided by hardwood wedges that are inserted in the slots through the deck between the panel being glued and the fixed rails, forcing the panel against the moveable rails.

Making the jig

For this build you will need:

- 25mm-thick plywood big enough to accommodate the size of panel you typically glue, plus the width of two rails. I used a 890mm square sheet because that is easily big enough for the guitars I typically build
- 50 × 75mm hardwood stock long enough to yield four rails the length of the deck
- 6 × 8mm diameter carriage or machine bolts together with nuts and washers
- Enough 25 × 25mm hardwood stock to make eight or nine 120mm long wedges

The first step is to mark and cut all four rails to length, as we will use these for slotting the deck. I used a 405mm tenon saw from Bad Axe Tool Works, filed with their special 'hybrid' filing. The deck contains two sets of slots; the first set runs from the edge of the deck, between the fixed rails and extends beyond the fixed rails. It is this set of slots into which the wedges will slide. The second set numbers only four slots and runs across the deck to allow the bolts holding the moveable rails to slide up to the edge of the panel being glued.



Cutting the four rails



Stepping off locations of the slots using dividers means there is no need to resort to mental arithmetic!

Construction

Lay out the spacing for the short slots. I prefer to avoid maths wherever possible, so I laid out my slots using dividers. I left 50mm at each end of the deck and adjusted my dividers to give eight slots down that edge. Next, clamp one of the rails across the deck to provide a stop for the router – these slots need to extend 40mm beyond the inner edge of the fixed rails. Using a 25mm diameter router cutter and your router fixed with an edge guide, cut all eight slots.

Next, rout the four slots for the moveable

rail fixture, using the same 25mm diameter cutter. Again, two of the rails can be clamped across the workpiece to provide consistent end stops – these slots start 110mm from the far end of the deck and finish 405mm from the fixed rails. I offset these slots from those on the opposite side of the deck to avoid weakening the plywood and increased the width of the two middle slots to allow for additional adjustment; this allows you to set the moveable rails at an angle for gluing irregular shaped panels.



The slotted deck

Drilling & bolts

Before the fixed rails can be glued to the deck, they need to be drilled for two bolts. These bolts help to locate the rail during glue-up so that nothing slips, and also provides additional security when hammering in the wedges. Drill the holes for the bolts, locating these to also drill through the plywood and avoid going through one of the slots you previously routed – mine ended up 125mm from each end. The bolts have a square section on the underside of the head and are threaded through the bottom fixed rail with the nut and washer on the top of the jig. Cut square mortises in the underside of

the bottom rail to accept the square section for both bolts. To mark out the mortise, insert the bolt and give it a sharp tap with a mallet; this will leave a crisp line round the edge of the mortise, then chisel the waste until the bolt sits in the hole correctly. Apply your preferred brand of glue to the two fixed rails – I used Gorilla Glue – then insert the bolts and clamp up to cure.

While the fixed rails are clamped up, drill four holes in the two moveable rails, corresponding to the location of the slots and mortise each of the holes on the bottom moveable rail in the same way as for the fixed rail.



A 6mm mortise chisel makes short work of the shallow mortise for the square section of the machine bolt head



Gluing the two fixed rails in position

DESIGN & INSPIRATION

Our correspondent

Final steps

Once the fixed rails have been broken out of the clamps, thread the bolts through the moveable rails so that the nut and washers are on the top of the jig and fit the rails to the deck. These rails should slide smoothly across the deck with the bolts loosened, but should be rock solid once the bolts are tightened up. Chamfer the edges of both top rails with a block plane and call the deck done.

All that remains is to cut the wedges. It is best if the wedges are not all identical, so cut these by eye with a handsaw – I used my 405mm tenon saw. Use a block plane to clean up any sharp edges, paying particular attention to the fragile thin end of the wedge.

Using the jig

Now it is time to press the jig into action. First, joint the stock to be glued up. For thin stock I use a long grain shooting board, as this holds the plane in a constant orientation to the work and avoids needing to balance the plane on very thin material – see issue 230. Using a square to check that the jointed edge is perpendicular to the face – as you would with thicker stock – can be very difficult on thin material. Instead, the easiest way to tell if you have a good joint with thin stock is holding both halves up to the light and rocking the jointed edges against each other. When the joint is solid you will feel it lock in place, and hold. Set the moveable rail so that when the work is butted up against the moveable rail there is a gap of around 10mm between the work edge and the fixed rail, then tighten the nuts to lock the moveable rail in place. This will give sufficient space for the wedges to be inserted.

Spread some newspaper – or greaseproof paper – on the deck of the jig so that the work does not get inadvertently glued to the jig, then spread glue on the joint. Rub the jointed edges against each other to ensure even coverage of glue and place the work flat on the deck of the jig, up against the moveable rail. Using a mallet,



Chamfering all of the sharp edges on the rails makes for a more pleasant experience when using the jig



A pile of oak wedges. I made more wedges than I need so that I have a choice of which wedge will best fit against the panel being glued up



The completed jig

hammer wedges into each slot between the workpiece and the fixed rail, making sure the wedges are set good and tight but not forced in so far that the edge of the work starts to splinter. Finally, place a long piece of scrap timber on top of each half of the work and clamp it to the deck so that the

work doesn't spring out of the jig. Leave the work in the jig for the curing time your glue of choice requires. Once cured, remove the wedges, followed by the scrap holding the work to the deck. The glue joint can be cleaned up with a plane and the joined panel incorporated into your project. *F&C*



A shooting board is often the easiest way to joint thin stock



Hammering in the wedges to clamp up the jointed work



The jig in operation, being used to glue yellow cedar for an acoustic guitar soundboard



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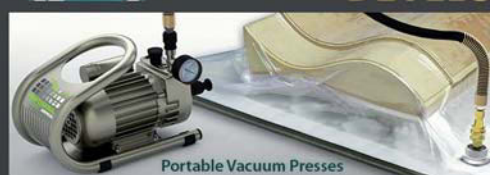
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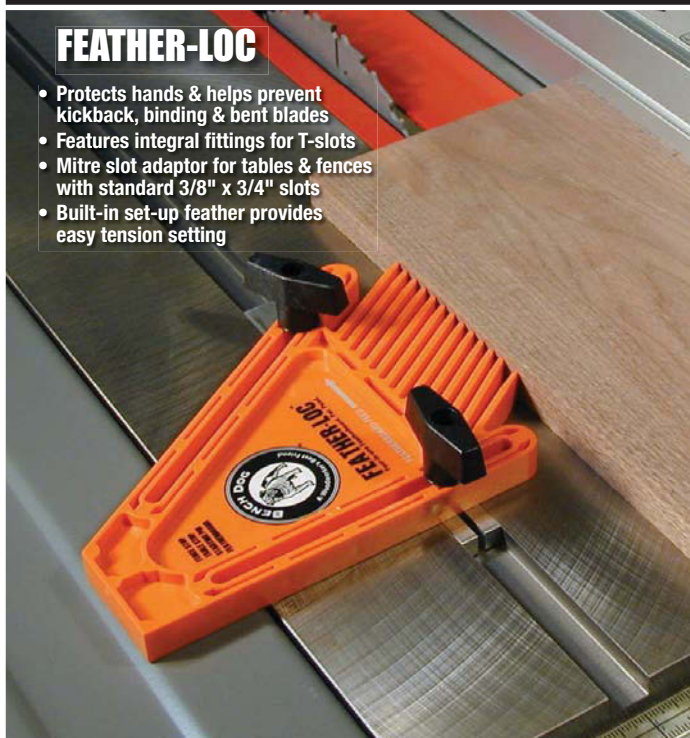


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When square gets boring

Anne Briggs Bohnett takes an in-depth look at using rasps and files to add all kinds of design features to spice up your woodworking projects

The traditional approach to hand tool woodwork leads us to become obsessed with 'square'. Our boards need to be perfectly square and true before we can cut dovetails or our joinery, and inevitably, our projects all end up square. Using rasps and files, one can ease an edge, round a corner, add a curve and do all manner of things that can add depth and interest to a finished piece. Rasps are very handy for shaping and quick removal of material. If you care to delve into the curvier side of woodworking, then grab a rasp and have a go.

Files, which have long been used in the workshop for sharpening saws, axes, auger bits, etc., also excel at overcoming wood. Clean up a rough surface with just a file or follow your rasp with a few strokes of the file and shorten your sanding time significantly.

PHOTOGRAPHS BY ANNE BRIGGS BOHNETT



All manner of rasps and files, new and old

Which rasps do I need?

Your rasp toolkit will vary depending on the tasks you desire to tackle with them, but I would highly recommend you start with one, high quality, general purpose rasp, a 230-280mm, 9-11 grain cabinetmaker's rasp, play with it for a bit and then decide which other rasps you may need. I truly believe I could get by with one 255mm, 9 grain Auriou rasp for the rest of my furniture-making life. A high quality cabinetmaker's rasp is likely all the occasional user will ever need. It

will have one round and one straight face and a tapered tip that will allow for various applications. That said, though, having recently got more into wood sculpture, spoon carving and saw handle making, I've since added a few different profiles to my collection – just to add some diversity.

Do not waste your money on cheap DIY store files and rasps. There may be names you recognise, but more likely than not, those formerly US-made, quality companies have moved their factories abroad and their quality plummeted. Just for the purposes of this article, I bought a £5 rasp set from Home Depot, some cheap Mexican-made Nicholson files and a slightly more expensive, Chinese-made rasp-shaped object from the Lee Valley catalogue. Using these 'tools' reminded me why I so often hear people say hand tool woodworking is slow, inefficient and entirely unenjoyable. In my search, I did, however, find a whole box of 'New Old Stock' US-made Nicholson files and rasps for a song and they are a delight to use.

A note on rasp-making

Rasps, at a quick glance, look somewhat similar to files. Files are made by machines and have long, even teeth that run their width. They cut slowly and their long, even teeth have a tendency to follow the grain instead of one's intended direction of cut. High quality rasps, on the other hand, have many tiny teeth that are cut by hand. The word 'grain' with regard to rasps refers to the number of teeth – 1 is very coarse, 15 very fine. A lower grain rasp will cut quickly but leave a rougher finish. Conversely, a fine grain rasp will cut slowly but leave a nicer finish. For woodworking purposes, 8-15 grain rasps are the most useful. The random tooth pattern that results from cutting rasp teeth by hand gives the user more control over the rasp. Instead of even teeth following the grain of the wood, random teeth overcome the wood.

Recently, the Italian company Corradi has developed a CNC program that is able to cut a fairly random tooth pattern for rasps. These are by far the best machine-cut rasps I've used, and for basic applications, the differences between their cabinetmaker's rasp and say, my hand-cut Aurio rasps are slight. If you are looking for a quality, affordable option, Corradi is a good one.



Corradi vs Aurio – a more affordable alternative



One quality rasp will serve you well your whole life



Don't waste your money on cheap copycats

Giving old files and rasps new life



Old to new toolkit

Antique files and rasps are quite literally everywhere and can be purchased very cheaply. Though I've yet to find a vintage rasp that comes anywhere near my Aurious in quality, old, pre-WWII Nicholson and other American, English and Swiss made files and rasps, if not already used to completion or ruined by rust, can be extremely useful in the woodworking shop. Often, you can clean, sharpen and get them in good working condition with very little time or effort. My favourite method is to use a plastic brush, dish soap and warm water to remove as much of the surface grime and rust as possible. Then an overnight soak in vinegar, followed by another brushing and a second soak should have your old file working just like new. The vinegar

will dissolve the rust and expose sharp new teeth. Rinse off all the vinegar, pat dry, give it a quick spritz of your favourite woodworking tool oil – I use jojoba – to prevent further rust, and it will be ready to be put back to work.

Vinegar is cheap and that's why I like it, but why waste it? Use minimal amounts of vinegar by making up a soaking vat shaped just like your files with some scrap PVC pipe and a cap. If there are any especially persistent wood shavings clogging your rasps and files that the brush just can't seem to get, a product called CMT blade and bit cleaner works fantastically. It is widely available and a quick spritz followed by a thorough brushing should have your tool free of clogs and ready to go back to work

Making a sculpted spoon with just one rasp and a file

To use your rasp with the most control possible, secure your workpiece in a vice, with holdfasts, or friction and fairy dust, whichever you prefer. Hold the rasp or file handle with your dominant hand and use your non-dominant hand as a guide for the tip of the rasp or file. Use a light pressure as you shape the wood with your tool. One-handed use is possible using movements similar to those you'd make with a carving knife, holding your workpiece in your non-dominant hand and pushing your tool with the other. Whether using the tool with one hand or two, use pressure to cut only on the push stroke, lift slightly to retract and then take another stroke.

Do not try to cut on the pull stroke or drag the tool on the wood as you pull your arms back – this will clog and dull your tool over time. After every few strokes, as the teeth become clogged, use a file brush with plastic or other soft – not metal – bristles to clean out the chips. For care, clean it very well after each use and occasionally give it a spritz of oil and a quick wipe with your oil-cloth.

While trying to think of a good starter project for your newly acquired rasp and files, I landed on making a sculpted spoon. Using fairly basic techniques, you can turn out a beautiful spoon in just a few hours. I decided to resurrect one of my first attempts at spoon carving, a project I'd abandoned halfway through that somehow escaped the burn pile for the last several months in a row. I used it as an example simply because it was horribly ugly. Rasps give you a lot of artistic freedom as you carefully and slowly remove wood. Rasps are a lot more forgiving than knives with regard to grain direction, so sculpting with a rasp tends to bring out the design in one's mind much better than a knife when it comes to less practised hands. Using only the 255mm, 9 grain Auriou and its competitor of the same grain, size and shape – simply for comparison's sake – I turned this piece from a hack job to a sculpted spoon.

Practising using a rasp

While it is very possible to use rasps on wet wood, it is much easier and better for your tools to practise on dry wood, so when it comes to making your own sculpted spoon, you can resurrect an old abandoned attempt or just grab a scrap piece of timber, bandsaw out your basic shape, carve a bowl and then grab your rasps to finish the job. I followed the rasps with a file and then gave it a quick sand before applying some oil. *R&C*

Supplier details

Contact: Auriou tools

Web: www.classichandtools.com

Contact: Corradi Shop

Web: www.corradishop.com

Contact: Lee Valley Tools

Web: www.leevalley.com

Contact: Nicholson Files & Saws

Web: www.nicholsonstool.com



Two-handed use



One-handed use



File and rasp brush



From total hack job...



... to totally passable sculpted spoon using one rasp



After a quick filing, sanding and oil



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ON SALE
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Hand drill restoration

Machinery tech

Tablesaw blade anatomy

Hand tool tech

Skew rebate plane

Feature

What makes the
marquetry donkey
a thoroughbred
among horses?

Finishing tech

Japanning made easy
Self-levelling lacquer



The saw doctor will see you now

In the next part of this series, Mark Harrell discusses reassembly, retensioning and bringing everything together to deliver a straight and clean cut

So far, we have assessed your saw to see whether it's worth saving, and having done so, we have completely disassembled the saw to include removing the back, cleaning the separate components and repairing the handle. Now it's time for reassembly and retensioning. The following procedure illustrates how to bring everything into correct plate tension, which will make your old saw deliver a straight and clean cut.

Step 1

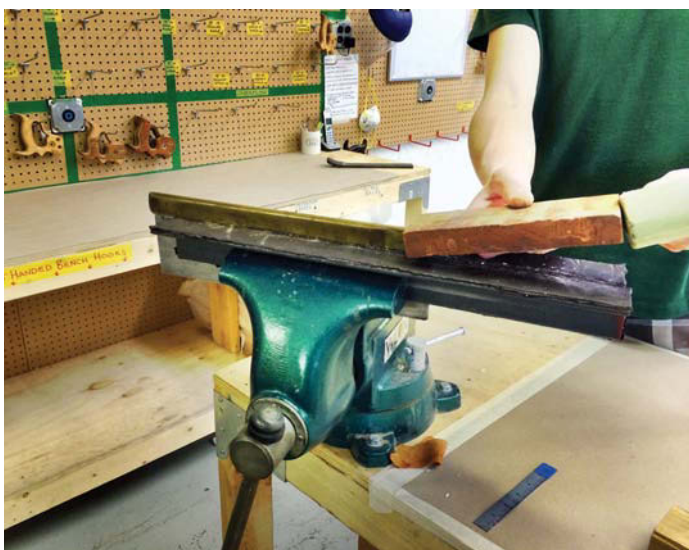
The advantage of owning a saw with a traditional folded back is that you can completely break down the tool, restore/repair and reassemble the parts into better working order than perhaps even when it left the factory. When it comes to saws, the trick is knowing how to manipulate the sawback, which is sprung – mechanically – onto the spine of the thin sawplate. ➤



Mount the sawplate tightly into the pair of leather-lined angle iron pieces and clamp in your vice

Step 2

As described in issue 232, cinch your sawplate tightly into the pair of leather-lined angle iron pieces and clamp in your vice. The idea here is to leave about 6mm of spine exposed above the surface of the angle iron before mounting the sawback. Orientate the plate so the etch, or decorative side of the plate, is facing you and that the toe of the plate – leading the direction of cut – is on your left and that the heel – the handle end – of your plate is on your right. Ensure the logo side of the sawback faces you as well. There is no sense in reinstalling the sawback backwards, right?



Shoving the sawback forward of the toe end of the plate to create an air gap

Step 4

When the sawback is about halfway mounted, tap the heel a few strikes to shove the sawback forward of the toe end of the plate by about 6mm. This is a deliberate, yet temporary alignment, which creates an air gap between the back edge of the sawback and the back wall of the mortise in the handle receiving the plate/back assembly when you mount the handle in the next step. You'll see why we're doing this in a moment. For now, seat the rest of the back onto the spine. Take care NOT to seat the sawback so deeply onto the sawplate's spine that the top edge of the spine comes anywhere near the inside fold of the sawback. That air gap between the spine and inside fold must be maintained for retensioning purposes. By the time you are finished, your sawback should be positioned slightly above the 'grime-line' where time and rust has etched an outline, reflecting the original seating between the plate and sawback.



Tapping the sawback onto the toe end of the spine and tapping it on with a light dead-blow mallet

Step 3

The next step is to tap the sawback onto the toe end of the spine. Start by aligning the toe end of the sawback's aperture with the top corner of the spine and gently tap it on with a light dead-blow mallet. You'll feel the lips of the sawback grab on, as the sawplate ever so slightly spreads them apart. Tap the sawback down until it's in about 6mm and then start walking the sawback onto the rest of the spine. You'll find you occasionally need to re-seat the sawback at the toe end, or else you'll cantilever the sawback entirely off – so watch what you're doing.



Remove the plate/back assembly from the vice and angle the iron to reattach the handle

Step 5

Once you have your sawback nicely positioned, you are now ready to remove the plate/back assembly from the vice and angle the iron to reattach the saw handle – see, it's all beginning to come together nicely. Again, note that you have deliberately mounted the back such that there are two air gaps in relation to how the plate/back assembly fits with the handle: one air gap between the underside of the sawback where it is intended to seat on the floor of the mortise receiving the plate/back assembly, and another air gap between the heel end of the sawback and where it is intended to seat against the back wall of the mortise receiving the plate/back assembly. This may look odd and cause you to panic, but don't worry as we're not going to leave it like that. Bear in mind that the two air gaps will allow you room to make the final back adjustments and associated retensioning with the handle in place.



Closing the air gap on the sawback

Step 6

Now mount your sawback into the vice where the handle clears the angle iron. Grab a piece of scrap wood and rest it against the toe end of the sawback. We're now going to tap the sawback laterally toward the handle to close up the air gap between the back edge of the sawback and the back wall of the mortise receiving the plate/

back assembly. Tap it lightly with your mallet until you close up the air gap – a pretty straightforward procedure, but don't overdo it. Too hard of a whack could fracture the handle. Just barely kiss the parts together. Note that this lateral shift evenly distributes clamping tension along the spine in consonance with the next step.



Making alternating taps at the heel...

Step 7

Finally, make alternating taps at the heel and toe, which seats the underside of the sawback onto the floor of the mortise receiving the plate/back assembly and again evenly distributes the clamping tension of the back along the spine. What you may have seen once as a kink along the toothline is now arrow-straight. Take measurements with your ruler to assess distance between the toothline and the underside of the sawback. Tap the toe end of the sawback until you have achieved equal plate depth from heel to toe. If you are a fan of a canted plate – less real estate at the toe compared to the heel – to avoid overcutting the far side of your work when making dovetails or tenons, now is a good time to tap the toe end of the sawback about 3mm deeper onto the plate compared to the heel end. Don't overdo this and you sure as heck don't want



... and the toe

to shove the spine all the way up into the inside fold of the back. Remember, having an air gap between spine and inside fold is necessary to allow you to make occasional retensioning taps fore and aft on call.

Step 8

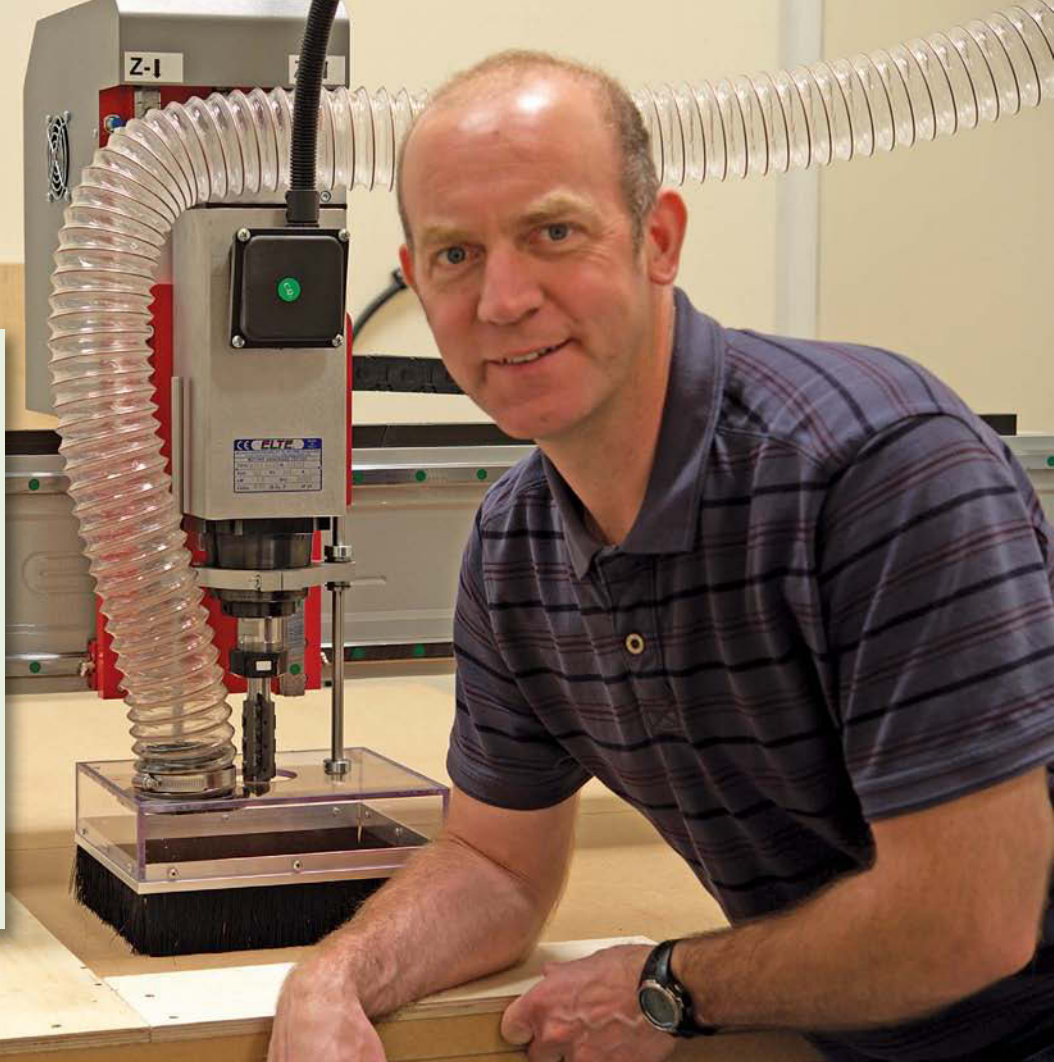
Remember that the key to reassembling the separate components of a vintage backsaw lies in creeping up onto the final measurements. Avoid heavy-handedness and your saw will thank you for it.

NEXT MONTH...

We'll true everything up plumb and square and prepare for sharpening. Cheers! *F&C*



Gordon Fry first appeared in *F&C* over 15 years ago, with one of his articles featured in the GMC book *Making Great Furniture*. He's an old school cabinetmaker/architectural joiner with a passion for growing his skills and developing alternative but complementary ways of working with wood. We've asked him to document his transition from seasoned woodworker to CAD design engineer. Gordon will be sharing his own experiences and those of other makers working a path through the automated world of woodworking. This regular column is expected to be a two-way dialogue and we'd welcome your input, either as questions, tips or just arguments for and against. Contact gordon@gordonfry.com or Derek Jones, *F&C* Editor: derekj@thegmcgroup.com



Gordon with the CNC setup at Wealden's offices

A journey into woodworking automation

In the first of a new series, Gordon Fry introduces us to the world of 3D CAD, CAM and CNC and how it can be applied to furniture making

Having spent many years creating wood products using conventional techniques throughout the design and making process, it was time for a change. The digital world surrounds us like a crazed rash; I guess I've been itching to have a go! But how can it work for me and where do I start? The hardest thing for me was getting over the fact that by the time I had worked through a process on screen 'I could have made it by now', but that's not the deal. It's a new way of using technology, which, by all accounts, should make life quicker and easier. But how can this be a reality?

Strong visualisation skills have always been at the heart of who I am. It is how I get it down for the rest of the world to see which will be the challenge.

CNC

Where does the CNC fit in to our workflow and do we even need it in the workshop? How quickly can the system process a project? The good news is that CNC is becoming more affordable and therefore within reach of even the smallest of workshops. With the likes of YouTube and forums across the planet anyone can access tutorial advice and get started.

Over the coming months, I will be exploring the relevance of CAD/CAM and CNC and examining some of the important aspects of CNC we face when working with this type of technology. Tooling, spindle speeds, feed rates, hold downs and toolpaths, just to mention a few.

I'd welcome feedback from those of you already using these systems, from tabletop to large industrial machines – please email gordon@gordonfry.com.

Initially, I was looking for a UK CNC manufacturer and came across Exel CNC Automation – www.exelcnc.com. As well as supporting UK industry, I needed to be able to understand this technology clearly and precisely. As this is going to be a testing machine for CNC cutters, certain aspects of this machine needed to be of a high specification, which Exel were able to offer. For example, the gantry that holds the engine and the frameworks for the bed are made from cast-iron – forged in the UK – as we wanted to avoid any aluminium alloy

frame materials. The weight of the cast-iron reduces the vibration that a cutter could produce under stress-loads. We need to be able to understand the limitations of each cutter and to reduce some of the variants that could be caused by any movement. An ELTE 5.6Kw air cooled spindle that runs up to 24krpm was installed. This spindle allows up to ER32 collets. This collet will accept a maximum of a 20mm shank cutter. The gantry has been raised to 250mm to allow for longer tooling. We have a remote DSP controller with USB data transfer and an auto tool height sensor.

During a half day's training at Exel, Mark Hepworth gave us a brief overview of a CAM package called CUT 2D, from Vectric – www.vectric.com. This is a basic package but allowed us to see the machine in action. I was able to walk around and see some of the other CNC machines they manufacture. After several months on order, the machine was finally on its way to us. It required the use of a Hiab to get the machine down to the unit.



Offloading new CNC machine into Wealden premises

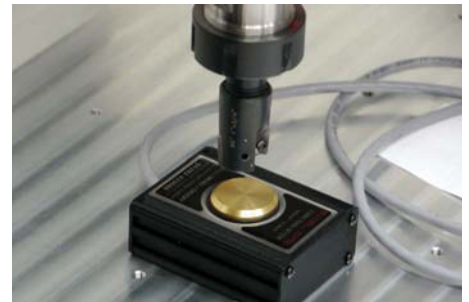
The history of CNC machines

The first type of CNC machines were built in the 1940s and were called simply Numerical Control (NC) machines. As the computer age took over these became known as Computer Numerical Control (CNC). This is the automation of machine tools that are operated by programmed commands.

In modern CNC systems, the use of CAD and CAM programs produce your designs into files that can be translated and then these extract the commands necessary to operate the machine. This is all done via a post-processor, of which there are many within the CAM software. Each machine will have its own language, so this makes it somewhat confusing and will take some time to align the CAM package with the CNC machine. This alignment is G Code



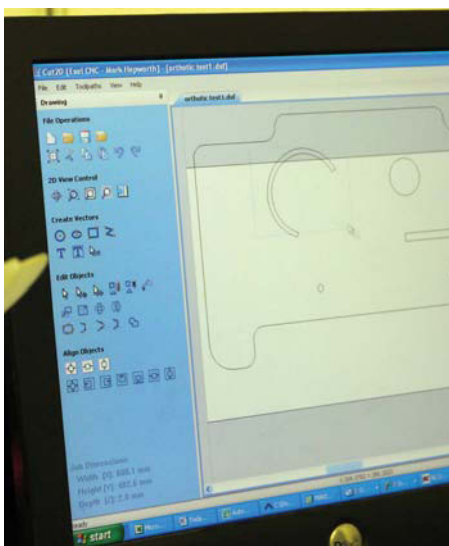
Inside Exel's factory



Auto height sensor



DSP controller



Cut 2D software by Vectric

3D CAD

3D CAD is an important tool that I believe is essential to enhance our ability and productivity in the modern woodworking industry. It enables us to design in the correct format to send to our CAM software package or allows the designs to be forwarded to sub-contractor via DXF files. So why go parametric? Why wouldn't a program like SketchUp do what we need? SU Pro is a fantastic tool for getting your designs down quickly and into a three-dimensional workspace to show others. However, it has its limitations, especially when you need to use it for construction details.

As an example, you have created working drawings for a writing desk and then you get a call from the client to say that the piece needs to be slightly smaller in order to fit into

a different space. At that point, the design and drawing time is thrown into chaos since all the jointing assemblies will have to be altered to accommodate what seems like a small change from the client's perspective. So who pays for this time?

As designer-makers, all of us are manufacturing a piece of furniture, it has parts and assemblies. Therefore parametric is paramount.

Autodesk Inventor and other software in the parametric field is never cheap and it certainly costs time and money to learn. However, if like me, this is your career, then it is a worthwhile investment. Once you have this skill under your belt, it opens up all kinds of possibilities for working with architects, designers, CNC companies and even large industry, let alone doing your own private client work more efficiently

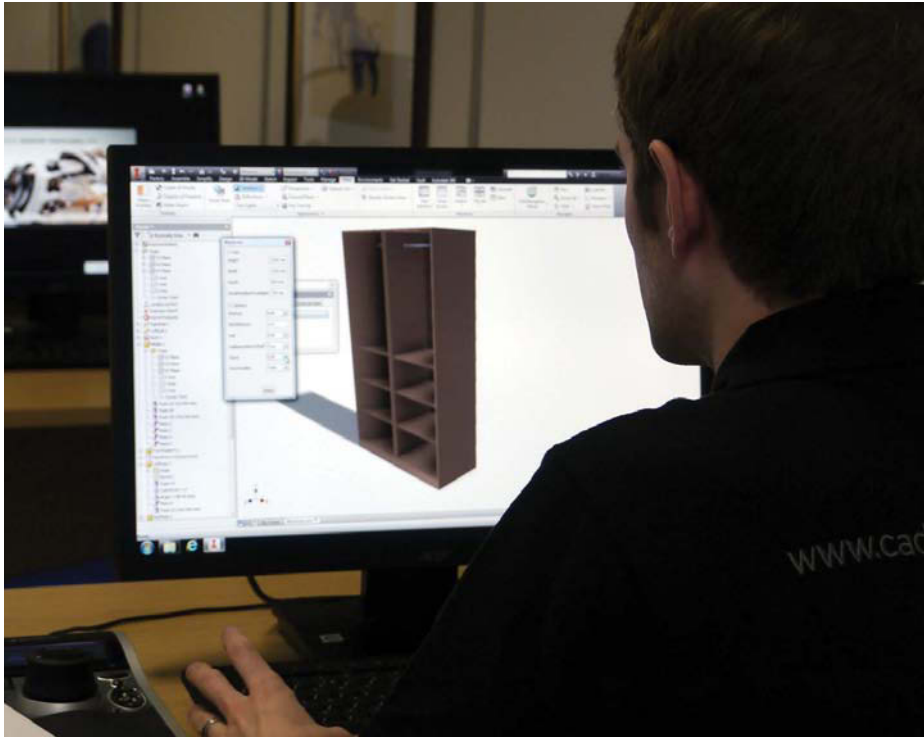
and hopefully therefore more profitably.

Having considered both Solidworks and Autodesk Inventor, I chose the latter as it includes HSM Works 2.5 for CAM and for its strong connections with AutoCad. I was introduced to Cadline – www.cadline.co.uk – a Platinum Awarded Autodesk Partner from whom I purchased a licence for Inventor 2015 along with some classroom training and e-training.

It is an understatement to say you can master this package in a short space of time, but with continued technical support through the Cadline Community along with plenty of e-training, effective progress can be made.



Cadline offices – what a calm and dust-free environment to work in!



Cadline offer classroom and bespoke training in Autodesk Inventor

Jargon buster

CNC (Computer Numerical Control):

A computer converts the design produced by Computer Aided Design software (CAD), into numbers. The numbers can be considered to be the coordinates of a graph and they control the movement of the cutter. In this way, the computer controls the cutting and shaping of the material. This term also describes the automation of machine tools that are operated by precisely programmed commands encoded on a storage medium, as opposed to controlled manually via hand wheels or levers, or automated via cams alone

CAD (Computer Aided Design):

The use of computers to create 2D and 3D designs. Current computer-aided design software packages range from 2D vector-based drafting systems to 3D solid and surface modelers. Modern CAD packages can also frequently allow rotations in three dimensions, allowing viewing of a designed object from any desired angle, even from the inside looking out. Some CAD software is capable of dynamic mathematical modelling

CAM DSP Controller

Digital Signal Processor:

Reads G-code or PLT programs from a USB memory stick or its internal memory, freeing up your PC. The controller then converts it into an output signal to the motor drives

ER 32: A collet that holds a 20mm shank. ER collets are slotted – alternately – from both ends and therefore compress onto the cutter along the whole length of the collet when tightened. This provides a better grip on the cutter shank. Some collets allow for a variant size of 1mm; however, this size difference could cause movement, which could potentially cause the cutter to fracture and then break. This also happens when the collet is worn. Therefore, collets should the same size as the shank of the cutter

DXF – (Drawing Interchange Format, or Drawing Exchange Format):

A CAD data file format developed by Autodesk for enabling data interoperability between AutoCAD and other programs. DXF was originally introduced in December, 1982 as part of AutoCAD 1.0, and was intended to provide an exact representation of the data in the AutoCAD native file format. Since its initial release, there have been many changes to the DXF file format specifications. For that reason, Autodesk maintains a current list of DXF file format specifications

What is parametric drawing?

This is a technology that is used for designing with constrained objects. Constrained objects are associations and restrictions that are applied to 2D geometric objects. For example, a line is defined as all of the points between two end points

Autodesk Inventor

Autodesk Inventor uses feature based parametric modelling techniques to enable designer-makers to incorporate the original design intent into a constructional model.

Geometric definitions of the design, e.g. dimensions can be varied at any time. Using parameters/tools – like dimensions – found within the 2D sketch of a part can be quickly modified to update the project. A rough 2D sketch of the plan of the base feature is the first process of the parametric drawing.

There are numerous constraints within Inventor, such as horizontal and parallel, to tie down the geometry of your base feature. Applying dimensions to this 2D sketch will give you constant accuracy in measurements.

On completion of the 2D Sketch, it will then switch to 3D mode where extrudes, revolves or fillets can be

applied to the newly created base feature.

Further base sketches can be added to the newly created 3D sketch by selecting a face of the existing geometry.

You can take your parts and make an assembly and these can be parametrically constrained to one another within a model. This system extends even further when using Inventor's layout drawing environment. If a change is made to the 3D model, this is reflected instantly on the drawings that show your parts and components.

Going forward

Over the coming months, I will be looking at how all this technology fits together in the workshop, along with relevant information from others involved in the industry. *F&C*



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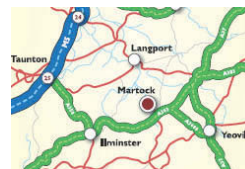
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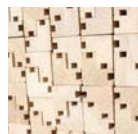
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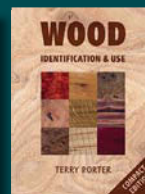


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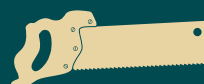
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The sharpest knife in the box

Geoffrey Laycock looks at the correct use of scalpels and shares his extensive knowledge on the dos and don'ts of scalpel safety

Using sharp tools comes with the territory for anyone working with wood and similar materials and we all know that sharp is far safer than blunt, but that also means that cuts can be easier and more serious if we do not follow a few basic rules. Working with very sharp scalpel and craft blades will never be totally safe but we can help you reduce some of the risks and keep you working rather than seeking

medical attention! Some of this advice comes from the huge experience gained within the healthcare field but is totally relevant to us.

We are going to look at a few safe practices regarding scalpel blades and handles that use the standard Swann-Morton fitting and also the craft or ACM blade system – Arts, Crafts and Modelling. To make life easier, when a handle has a

blade fitted, we will simply refer to it as a knife. Some of the following is also relevant to trimming or 'Stanley' knives. Founded in 1932 and based in Sheffield, Swann-Morton is a designer and manufacturer of surgical and craft blades and handles and recognised as a world leader in this field. A recent development has been the Retractable scalpel handle, which allows the blade to retract inside when not in use.



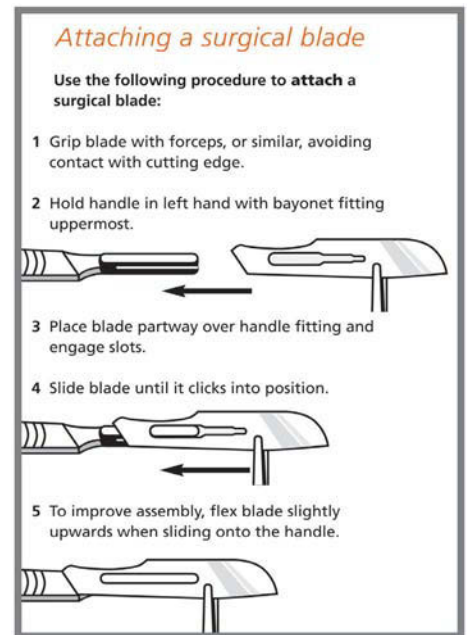
Storage & fitting

The good thing about using these blades is they are ultra-sharp and low cost, especially if you buy boxes of 100 or 50 once you know which blade designs are best for your work. Changing blades before they become too blunt is safer and essential with delicate work, but increasing the number of changes increases one of the serious risks.

In most healthcare workplaces, fitting or removing blades from scalpel handles and not using the following method is considered a disciplinary offence, such is the risk. Forcing a blade in or out of a handle using fingers is quite simply asking for a serious cut. The correct method is to use a pair of forceps or surgical needle pliers – which you probably do not have – or long nose pliers. We have reproduced the official Swann-Morton guide to fitting and also removal from a Retractable knife – it is the same technique for the standard handles. Please note the Retractable blade can

be in three positions: closed, the middle position for cutting and fully extended for blade changing only – do not cut with the blade fully extended. In a few photos, I'm wearing a blue surgical glove only to make the image clearer. The design of the handles and blades favour a right-handed person for these tasks; left-handed users think carefully about exactly reversing procedures. I use a pair of flat long nosed mini-pliers originally used in the textile industry, but almost any will do. It is important when fitting – so as not to damage the edge – not to let the jaws contact the blade cutting edge. Also avoid this when removing so as not to possibly break fragments off. ACM blades are slightly easier to fit/remove but using pliers is still also a good but not essential practice.

Old blades should be placed somewhere safe, for you and anyone else. Be especially wary of leaving used, unwrapped blades around where children may find them and



The correct way to fit a blade



Remove the blade from the wrapping using the pliers and slide onto the handle bayonet fitting until it clicks



I prefer the alternative removal method – grip the back edge behind the bayonet fitting with long-nose pliers and twist upwards then slide off the handle

Use the correct grip

Firstly, always use a handle. Some professionals – mentioning none in particular – use some blades alone. This is not a good idea and can easily go wrong so very simply don't do it. I have also seen people using double-edged razor blades held 'carefully' – please NO.

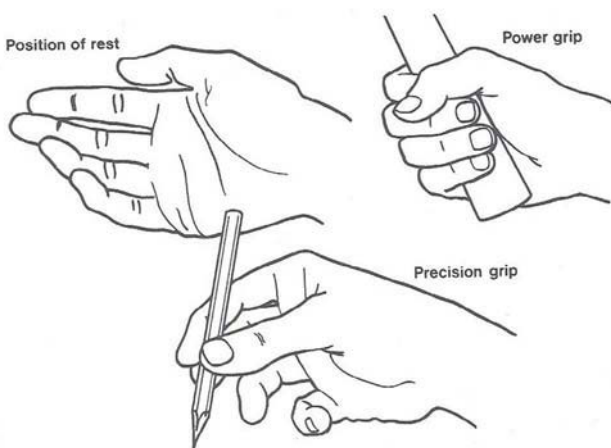
There are two basic categories of grip we use: precision and power. The amazing design of the hand and its control systems means grip is infinitely adjustable and

within these two categories, we then use many variations. The power grip, as used with a hammer, may be used with the very heaviest of cutting with perhaps a trimming knife, otherwise you will always be using a form of precision grip. We cannot tell you what is best for your particular work, but understanding these principles may help you reduce your own risks.

Many people instinctively pick up a scalpel and assume a 'pen' grip, as if they were

going to write with it. This is an acceptable grip but should only be used for the lightest, most precise cuts. Trying to use this grip for cuts where increased pressure is applied can result in the fingers sliding down the handle and there is nothing to stop the side of – usually – the middle finger running into the edge of the blade; some blades may not injure, other designs will. The correct grip for applying any pressure we will call the 'surgeon's incision'

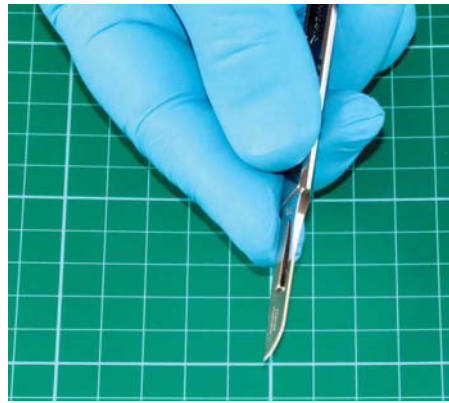
grip. Looking at a Swann-Morton handle, you find a machined bulls-eye either side: grip in these two positions with thumb and middle/second finger with index finger on top of the handle pointing down towards the blade. This allows precision manipulations but using the index finger to apply downward cutting pressure. In surgery, this would be used with a No.10 blade and the handle at a low angle, which ensures the efficient long curved cutting edge is used; the pointed No.10A and No.11 blades are typically used 'upside-down' for stabbing incisions. For woodwork, as the No.10 is more of a slicing cut, it can be much cleaner, whereas the pointed 10A and 11 are almost cutting one fibre at a time if held too upright, and as it still forms a pointed tip it can be used in corners. One basic safety point – never use a pointed blade such as 10A pointing and pushing towards your other hand, if it slips it is specifically designed to go in with no effort at all. Although many craftspeople use the pointed No.10A and No.11 blades, it may be better to switch to a No.10 in many instances for long cuts and the ACM No.5 handle is definitely best for the heaviest precision cutting and also minimising grip muscle fatigue if working for a protracted period.



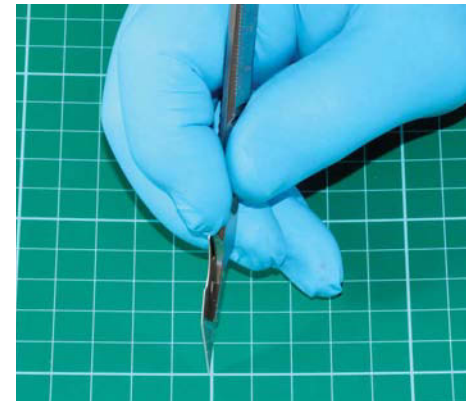
Different types of grip



Using the 'surgeon's' grip allows downward pressure to be applied safely. My steel rule has 800 grit self-adhesive abrasive on the reverse side to reduce slipping



Looking from below, handle gripped by thumb and second or middle finger, index finger applies cutting pressure



Very pointed blades are very useful but the original design is for penetrating cuts and used with the edge upwards

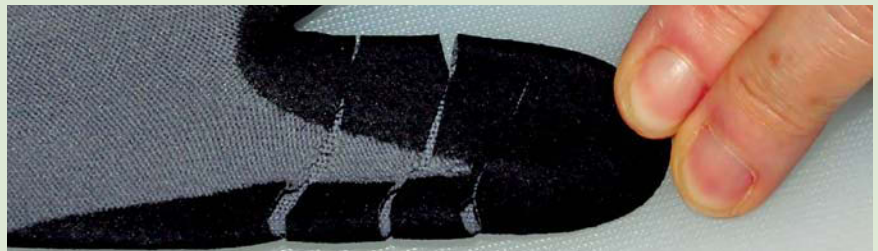
Using gloves

Wearing a glove on the non-knife hand can be a good idea at times and fortunately the design of gloves has improved enormously. Look for a seamless design conforming to EN 388: gloves giving protection from mechanical risks. Cut resistance is indicated with a number from 0-5 – many are 1 or 2, which could be sufficient for the one-off slip while 5 is the highest level achievable unless you use stainless steel chain mail gloves; even these and most others offer limited 'stab' resistance if using pointed blades. Markings consist of four numbers, the second being cut resistance. Do these gloves protect? See later. Be aware there is a growing trade in counterfeit PPE, such as gloves, so any bargain ones offered to you may not perform as marked.

Glove testing

The photo shows a glove to standard EN388 with cut resistance 1, the lowest acceptable result. I sacrificed this pair to see how these cheap ones coped with a new Swann-Morton 10A blade. Held stretched on a cutting board, I ran the blade with 'cutting thin veneer' pressure over the glove finger eight times. Although there were areas where full cut penetration resulted, injuries to the finger

would have been less serious compared with no glove. The photo actually shows the result when I did the same test in a new location with a No.10 curved blade and, as expected, cut resistance 1 provides almost no protection against this super-efficient blade. This one unscientific test convinced me to wear a left-hand glove more than I do, but which are level 5 cut resistance, seen in some other photographs

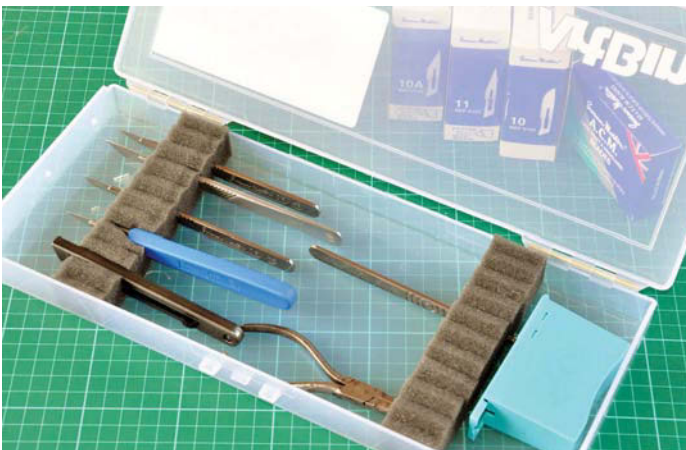


The results of various blade cuts on a pair of cheap gloves

What do you do with your scalpel between cuts?

We need to consider how you store scalpel handles with a blade during and between work sessions. For storage, I now use a plastic artist brush box from HobbyCraft. This has two foam inserts that will hold each handle, thus preventing damage to fitted blades and it also holds non-bladed handles securely; it also contains my pliers and blade disposal box. It can be used during work, resting a knife in its storage position. I also use an IKEA cutlery tray and sometimes a

recycled plastic food tray to keep whatever knives are in use contained, visible and pointing in the desired direction ready to pick up. An offcut of foam stops knives moving around. A common accident if a knife is just left on a surface is using the hand to brush something out of the way and finding the blade ready and willing to cause you injury. It is also worthwhile thinking about what you do with chisels, marking knives, etc. when working to protect their edges and your fingers.



Intended to store artist brushes, this box costs about £6. I have handles with blades all at one end, bare handles at the other end, blade changing pliers and a Swann-Morton blade remover disposal box. I can rest a knife in its normal storage slot between cuts



If I'm doing a lot of work with different knives, I use a cutlery tray to keep knives separated and easy to pick up – I can use this for chisels on the bench. You could use a rescued food tray, which also keeps knives visible and in one place

Passing a scalpel to someone else

In a surgical environment, you would be surprised how many injuries this has caused. Perhaps on TV you have seen the scalpel smacked into the hand of the surgeon by the nurse? Not good and not allowed. The preferred medical option is passing in a tray to allow the second user to pick up, but

a single contact with a metal surface can damage the blade edge so other options are also available. If you need to pass a scalpel to another person, place it in your work tray and let them pick it up, please! Oh, and never converse while holding one, especially if you tend to make hand gestures!

And finally – when you cut yourself

And you will! Put together a small first aid kit before you need it. I have a small plastic food container with supplies useful for us woodworkers and it is so convenient that I always take it when working elsewhere. You need to make the decision on when an injury requires professional attention but bear in mind any stab injury to the palm of the hand

can result in nerve damage, deep cuts to palm and inner face of fingers can result in tendon damage, as can injury on the inner face of the wrist. Don't go to A&E, you will get quicker treatment at your local walk-in treatment centre, so find out where it is now so you are prepared or call 111 for advice. Learning basic first-aid is a good idea.

Suggested minimum first aid supplies

Fine point tweezers
Wound cleansing tissues
Antiseptic spray
Wound closure strips
Waterproof plasters – extra long are better for fingers
Heavy-duty fabric plasters – extra long are better for fingers
Roll of adhesive elastic dressing
Roll of dressing tape
Spray wound cover/spray plaster
One crêpe bandage for applying pressure
Sterile gauze dressings



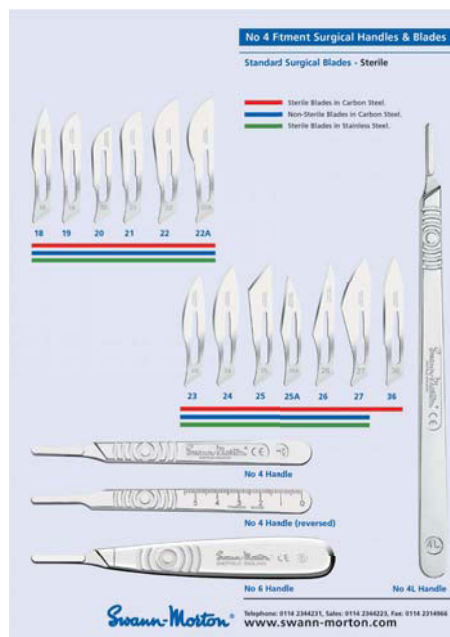
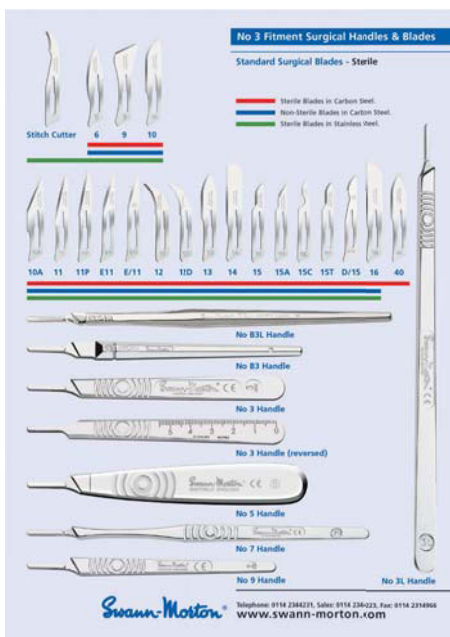
The Swann-Morton Retractable is worth looking at – it has less blade projection, which reduces the chance of unintended contact and the more chunky handle is comfortable to use for longer periods and offers good control

A guide to scalpel handles & blades

The variety of available blades can be bewildering but Swann-Morton have kindly provided three guides showing the two commonly used handle sizes and the latest version of Retractable handle and appropriate blades: there are many more specialist ones! The No.3 and No.4 handles can also be sourced as long versions. Also shown is the Arts, Crafts and Modelling

or ACM set. There are many other handle designs and they may be more appropriate for your work so look at the options on their website – see opposite page.

If you are new to using this type of cutting tool, I would recommend starting with the Swann-Morton ACM Tool Set 9101. You can buy other brands but they save little money and the blades you get in the set will be of



A few suggested guidelines

Rule 1:

Store new blades in their wrapping and in a container where they can be retrieved without 'fishing' with fingers

Rule 2:

Never use a blade without a handle – some 'professionals' do – it goes wrong

Rule 3:

Fit and remove blades using the correct methods only

Rule 4:

Dispose of used blades safely – think of others

Rule 5:

Use a small tray on your working surface to hold knives – never leave the knives just lying around to catch your hand on

Rule 6:

Wear eye protection when fitting, removing or using these blades on a hard material. Would you want a cutting edge fragment going in your eye?

Rule 7:

Use an appropriate grip for the work – a 'surgeon's' grip for applying pressure

Rule 8:

If cutting using a straightedge or other guide, think where the knife could go if it veered off course and move your hand!

Rule 9:

A cutting straightedge with raised handle can reduce the risk of contact with a knife slip

Rule 10:

If you use a steel rule as a cutting straightedge, fasten a fine grit abrasive paper to the underside; this helps stop it slipping and makes cutting accurately easier

Rule 11:

Never place any part of the workholding hand in line with the direction of cut

Rule 12:

Cut slowly – it will be more controlled

Rule 13:

Consider if, for the work you intend, wearing a cut resistant glove on the non-knife hand might be a good idea

Rule 14:

As soon as the blade starts to blunt, change it – you will be less likely to slip

Rule 15:

Have a first aid kit with suitable contents available. Our suggested contents are only a starting point

a very high quality. The two smaller handles equate to the Scalpel handles No.3 and 4 and provide good non-slip grip surfaces.



I have used non-branded blades and again, they save little money and often are not the same quality. ACM blades are more expensive than scalpel blades but are easier to fit and include two chisel widths, which are useful for when a conventional chisel just will not fit. Scalpel blades often fit into ACM handles but this is not recommended as they may not be as secure in use. *F&C*

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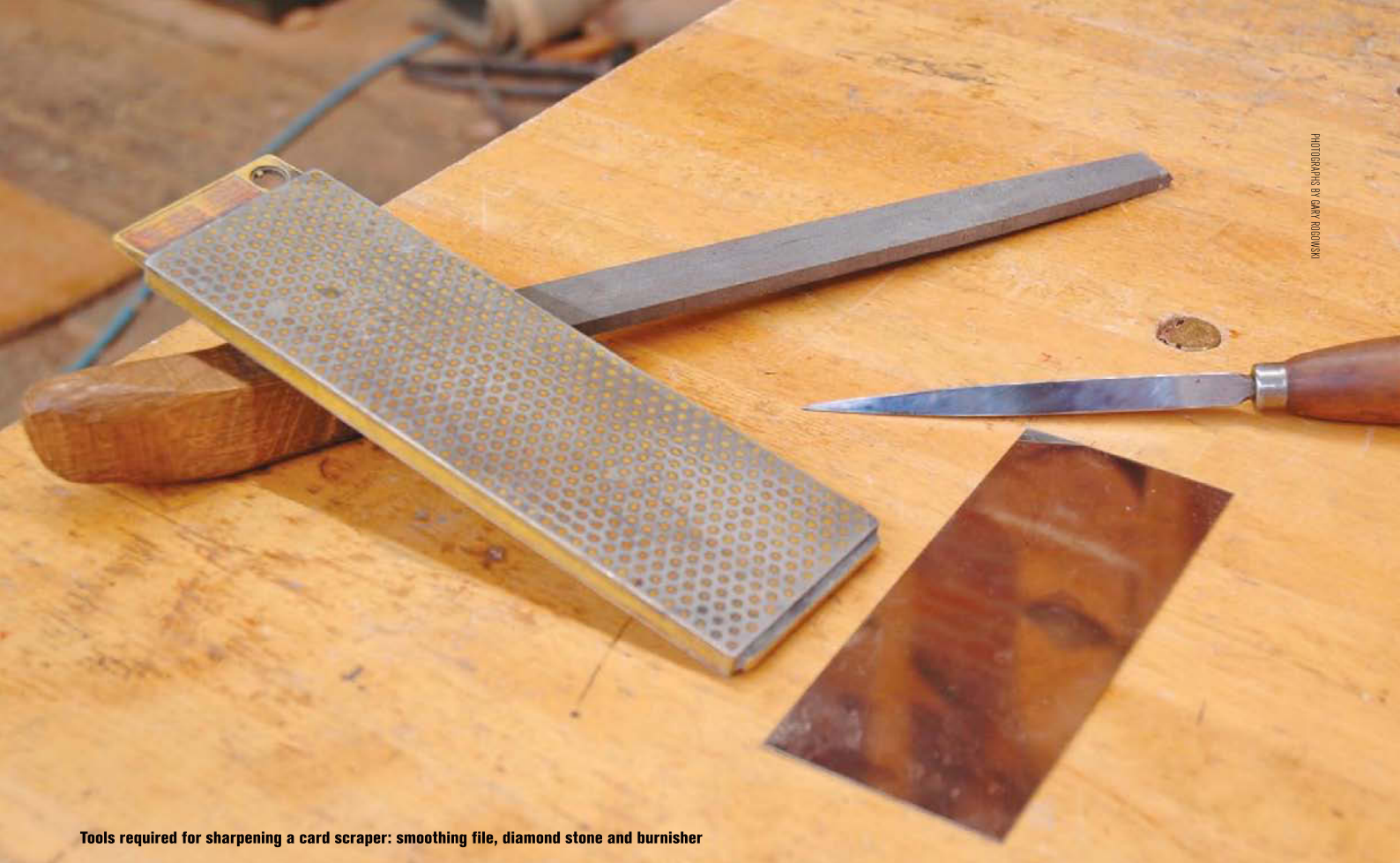
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Tools required for sharpening a card scraper: smoothing file, diamond stone and burnisher

Scraper sharpening: It's in the filing of the edge



Gary Rogowski shares a technique for getting the edge on your scrapers that everyone talks about. It's not rocket science but it makes a world of difference

There is no fool like the one at the bench who tries to sharpen their scraper and consistently gets only dust for his efforts. I was that fool. Perhaps I got a shaving or two on one side or the other of this blade. I could get 60% of my scraper sharp, it was just that I couldn't predict which side of the blade it would be sharp on. The key I learned was accurate filing. The blade, the burnisher and the stone, were all of limited importance – it was the filing that was the key to success.

Using the bench hook

What I used to do, and what you may do still, is to put the scraper in the vice and file away at it. It's what the experts tell you to do. The file is straight so your edge will be flat, but will it be square to its two faces? That is the

key. So they have you place your scraper in a holder or you buy a file positioner to keep it square to your blade – sometimes this works.

One day, frustrated by my inabilities, I

thought to myself, what if? 'What if' leads us to possibilities: what if it takes us to places we hadn't thought of and what if it opens doors? What if I placed the scraper flat on



Filing a scraper using your bench hook to reference off

my bench hook and held the metal smoothing file right up against the edge of the bench hook? This was at 90° then and so my filing would be more accurate. And it was. It's a bit tricky to hold onto everything in place here so I adapted this geometry and moved the file to the vice, locked it in place and pulled the scraper past it. And voila! This gave a straight edge again, thanks to the flatness of my file, but it was also square since the vice on my bench was close enough to square with my bench top. With a good edge, and I could tell by the filings turned onto both faces of the edge, I could move on with confidence.

Using a diamond stone

After filing the scraper, there will be fairly coarse file marks left in even by a 'smooth' file. The next step is to remove those marks with a diamond stone. I prefer to use a diamond stone as the scraper blade would cut into a waterstone. I placed a two-sided diamond stone in the vice and using the coarse side first, removed the file marks. Next, I flipped the stone around and polished the scraper edge with the fine side of the stone. I now have a scraper that's ready for cutting. Take this blade, properly filed and stoned and try it – it cuts.



File in the vice with card scraper



Feeling the slight burr left by the file. This is felt on both faces of the scraper



Removing the file marks with a diamond stone now held in the vice. This stone is two-sided, coarse and fine



As you will discover, light scraping is possible straight from the diamond stone

Using a burnisher

If I want a more aggressive cut, then I take my burnisher to the blade. I use a triangular one from Pfeil. When I'm on the road, teaching, I use a push rod out of a 1964 VW engine. It works well, but sputters going uphill. I place my scraper flat on the edge of my bench and first, take any burr off the edge produced by

my filing and stoning by holding the burnisher flat to the blade. Then, I raise the burnisher up 5° and consolidate the steel at the edge, mashing it down, and perhaps turning a small edge or burr downwards. Next, I hold the burnisher vertical onto the edge of the scraper and draw it towards me using firm

pressure – hand shake pressure – 'I want to get the job' hand shake pressure, firm but not too frightening a grip. I draw the burnisher towards me at 90° and then 87° or so and then 85° and three or four times in that general vicinity and again the French come to mind – voila! I produce for you the edge.



For a more aggressive scraper edge, start by removing any burr from both faces. Hold the burnisher flat to the face and pull it along



Raise the burnisher up 5° or so to consolidate the steel along its edge



Hold the burnisher at 90° and take three or four passes on the upper edge of the scraper rolling the edge over to 80° or so

Scraping in action

This hook is now much more aggressive and is felt across the entire edge of the scraper. It is suitable for removing glue, levelling surfaces, cleaning up milling marks, correcting flaws in grammar, or errant scratches in your wood. It can smooth a finish when in the less aggressive mode or take out a chunk of tear-out that looks a mile deep with just a few strokes. Be careful of your thumbs

as when using a sharp scraper, your immediate joy in producing shavings will lead you to heating up the blade rather quickly. And since you have an edge along the whole length of the blade, you can use that whole length by simply moving one hand or the other on top of the blade and placing your thumbs where you want to cut. It's in the filing of the edge: get that right and the rest, as they say, is history. *F&C*



Scraper making fluffy shavings

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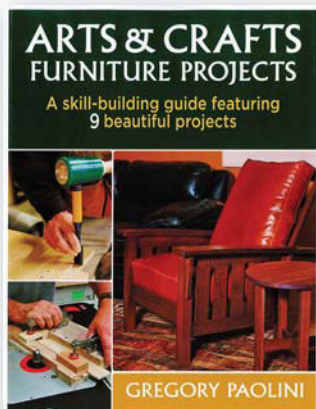
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Workshop library

We review *Arts & Crafts Furniture Projects* by Gregory Paolini, *Chairmaker's Notebook* by Peter Galbert and website of the month is from The Renaissance Woodworker



Arts & Crafts Furniture Projects

by Gregory Paolini

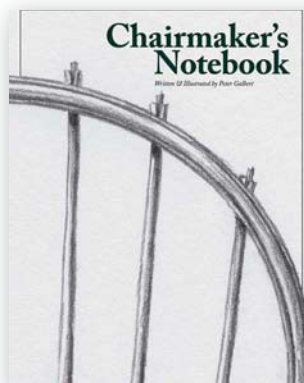
In *Arts & Crafts Furniture Projects*, Gregory Paolini gives you the opportunity to create nine pieces of classic furniture for your home. The book is inspired by Gustav Stickley, the Greene Brothers and other craftsmen and designers, who established Arts & Crafts in North America more than a century ago. Original pieces are highly collectable and the Arts & Crafts-style furniture is back

in fashion so Gregory's book comes at a perfect time.

There is a lot of text, but it is split up into smaller sections making for an information-packed read. The introduction is well written, as is the text following and the photographs are great quality. The illustrations throughout are fairly complex, but with all the necessary elements of the particular project highlighted.

The great thing about *Arts & Crafts Furniture Projects* is that each subsequent project builds upon the previous learnt skill, while introducing new ones. This makes the book flow brilliantly. As Gregory mentions: "Each project introduces a skill set or technique to be mastered." The author has also included smaller plans for useful jigs, which serve to help you in your project work as well as allow you to broaden your skillset.

Published by Taunton Press Inc
ISBN: 9781600857812
176 pages £17.99



Chairmaker's Notebook

by Peter Galbert

It's easy to overlook the book itself as an art form when, quite often, it's the contents that we are most concerned with. Lost Art Press has a track record for producing the sort of material that appeals to the diminishing number of people who like to buy books. In this context, it's quite conceivable that a good book may lack good content. With *Chairmaker's Notebook* you get the best of both worlds:

beautiful artwork, exquisite craftsmanship and the most thorough explanation on how to build a Windsor chair you will ever need. Each 'how to' step is backed up with plenty of 'why' information. Peter Galbert not only wrote *Chairmaker's Notebook*, but he also illustrated it, and it's inconceivable now that anyone else could have contributed more to what is certain to become a workshop library classic.

Just as with AA Milne, you're left in no doubt that what you see and hear on the page is exactly as it appeared to the author. Buy it, read it and learn from it but, above, all enjoy it. The experience will stay with you forever.

I'm off to the Hundred Acre Wood now where I fully expect to find Peter Galbert and friends dropping sticks into the running water over the side of a little wooden bridge.

Published by Lost Art Press
ISBN: 9780990623038
406 pages £31

Website of the month

The Renaissance Woodworker

The Renaissance Woodworker homepage doesn't do the website justice! At the time of writing, the homepage features only a video and small section of text. At the top of the page is a short menu, featuring an 'about' page, 'Hand Tool School', 'blog', 'articles', 'podcasts', 'projects' and finally, 'techniques'. The website is run by Shannon Rogers and was started in 2008. Shannon regularly posts video podcasts and audio podcasts.

'Hand Tool School'

An interesting page on Shannon's website is his 'Hand Tool School'. From a drop-down menu, a 'tool list' can be found, but upon selecting the 'Hand Tool School' button you will be taken to a page of 'semesters'. These classes are to be signed up to and paid for. There are six semesters to choose from and a demo page. The 'tool list' is a page for those asking about tools to start with – Shannon mentions that he 'aims to teach fundamental skills and wean away reliance on speciality planes and such to only do one job'. The page looks at planes, saws, chisels, drilling, marking – a number of different tools under each category – and at the bottom of the page there is a space to post questions to Shannon.



Blog, projects and techniques

The blog posts are clear and easy-to-read with a title, often a video, a variety of text lengths and corresponding images throughout. Under 'podcasts', Shannon posts to a 'chip n tips' page, where he captures quick tips and techniques on film and sends these 'nuggets' out.

On both his 'projects' and 'techniques' pages, Shannon has a host of ideas to try, providing full instructions with great images alongside his 20+ projects. Shannon covers finishing, hand tools, hand planing, joinery, moulding, hand sawing, sharpening, woodturning, woodcarving, woodworking safety and more in his 'techniques' page.

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Back to black

From the workshops of Robinson House Studio, Danny Maddock shares his tips and techniques for ebonising

PHOTOGRAPHS BY DANNY MADDOCK

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One of the elements of woodwork that appeals to us all, makers and clients alike, is the use of beautiful timbers in our creations. Timber choice can make or break a piece of furniture, and we tend to lean toward the decorative timbers in much of our work at Robinson House. It is then only inevitable that over time these timbers will become sought after, expensive, and ultimately endangered.

Ebony (*Diospyros spp.*) is one timber that has fascinated us and has been utilised in fine furniture for hundreds of years – there is no other timber like it, an extremely strong

and durable hardwood, with a deep, natural black colour. It is the colour of ebony that has made it so popular over the years and its association with luxury goods has driven up the demand and, therefore, the price. Some close grained hardwoods are a great alternative to ebony in terms of their structural properties but nothing really says ebony quite like the real thing. There are, however, many ways of 'ebonising' other species to create the desired effect for a fraction of the cost.

I work as a craftsman at Marc Fish's workshop, 'Robinson House Studio', and

an important part of my job is to experiment with a vast array of materials, techniques and finishes. Everything we learn by experimentation we pass on through our courses held at the studio. We recently made a console table in ebonised oak (*Quercus spp.*) and bronze – see page 75 – where we needed to achieve a natural looking matt black finish. What we came up with, thanks to colleague Chris Funnell, was something we have not seen used in furniture before. The research and development carried out for this particular piece inspired the subject matter for this article.

Preparation

It is important to properly prepare the timber before ebonising. When you introduce any kind of moisture to wood, it will raise the grain and give a rough surface even after sanding. To begin with, sand to a smooth finish – 240 or 320 grit is acceptable – and simply apply water to the wood with a spray bottle or a damp rag. Let it dry and the wood will feel rough again. Sand back to whatever

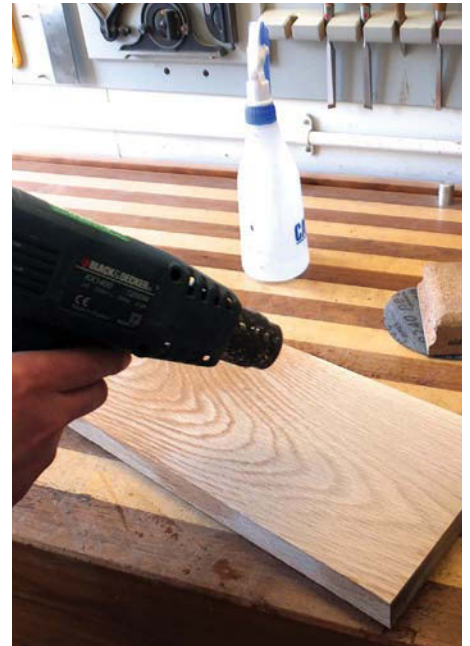


Sand the timber to either 240 or 320 grit

your last grit was and repeat the process three or four times. Each time you raise the grain and then cut it back, you are removing raised fibres that could lift during staining and it should be smoother than the time before. If you skip this step and sand the wood smooth after staining, you will sand through the stain and end up with a patchy finish. Preparation is key!



Spray the timber with water to raise the grain



A heat gun or hair-dryer can be used to speed up drying

Water-based and spirit-based stains

On today's market, there are dozens of different stains. Aside from their compatibility with other products they all do a similar job and for our research I was using Liberon's ebony spirit stain. It is easy to apply with a brush or a rag and is inexpensive. Apply as many coats as is necessary to achieve the colour you are looking for – I have found that three or four is adequate when using a spirit-based stain as it is possible to build depth of colour with multiple applications. With any finish, I would recommend de-nibbing between coats, even when the proper preparation has been carried out.

De-nibbing is the same process as sanding or cutting back except I always associate it with much finer grits, such as 1,000.

When you are working in a dusty environment, dust can stick to your finish when you leave it to dry. It is the nature of the workshop unfortunately, but I've always found that a quick rub down with a very fine grit in between coats will give a lovely smooth surface every time and take care of any unwanted fragments. These stains will also work with any type of timber; it is almost like painting the wood rather than changing the colour of it.



Apply the stain with either a rag or brush

Spray cans

One of the best, and most surprising methods we tried was spray paint: one can in matt and the other in satin finish. It is easy to apply: simply spray your components from a distance of about 300mm and ensure you cover evenly. Surface preparation is less important with spray finishes as there is less moisture being introduced to the timber. You will want to build up multiple coats for durability but be sure to cut back between each one with a fine grit, such as 320 or 400. Anything finer will take too long to cut back and with anything coarser you may go through the paint. As I mentioned before, we were looking for a consistent matt black

finish and how we achieved it was almost irrelevant. Spray paint from an aerosol can may not sound like the most desirable finish to use on a piece of furniture, but it might work for you. Low tech is sometimes all you need. The matt paint finish almost gave us what we were looking for but lacked a natural, organic quality. There is also a product on the market made by Chestnut Products – an ebonising lacquer that will give a similar finish to black spray paint but has a slight sheen. Once again, although it is easy to apply and gives a good colour, it lacks the natural black look appearance of ebony.



Makeshift spray booth – spray at a distance of 300mm

Acetic acid

So far we have looked at ways of staining or painting wood, but these methods are purely superficial, whereas the following techniques actually involve a chemical reaction to change the colour of the wood. One well-known method uses acetic acid – vinegar – to change the colour.

Acetic acid on its own will have no effect on wood – it must be combined with iron for it to react with the tannins found in certain

timbers. Have a look around your workshop and find as many rusty nails, screws, hinges, etc. as you can and add them to your acetic acid. You can also use wire wool – just spray it with water and leave it outside to rust. Once the acid has reacted with the iron and rust, you have a solution called iron acetate and it is this solution that reacts with the tannins in wood and turns it black.

You can use standard vinegar for this but

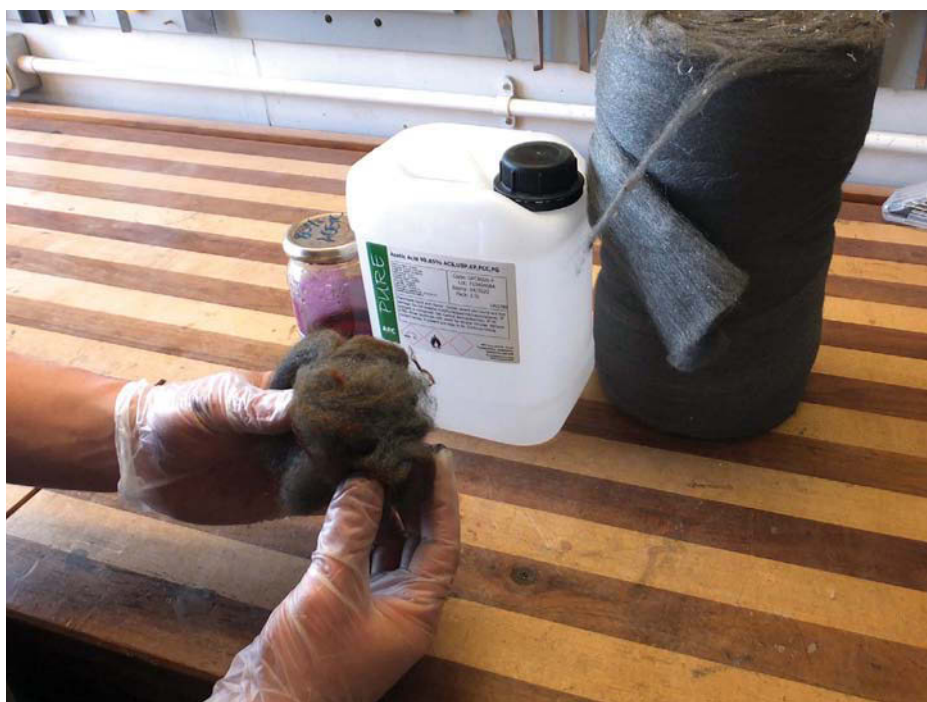
we've found that the purer the acetic acid, the faster it will dissolve the rust. Normal vinegar has an acetic acid content of around 10-15% and this can be used, but we prefer to use acetic acid at a much higher purity. We have had 80% and also 99.85% in the past, but once we have created our iron acetate, we dilute it down with water to about 20% acetic acid. With standard vinegar, you may need to leave it a week or

two to dissolve the rust and wire wool. If you do buy pure acetic acid, then be sure to use an organic filter on your face mask as well as goggles as it is nasty stuff!

Timbers differ dramatically in their tannin content, and normally this may limit you in terms of timber choice. Oak and walnut (*Juglans spp.*) have a high tannin content and lend themselves to this method of ebonising.

There is, however, a way around this by adding tannins to timbers using either tea or tannic acid. You can buy tannic acid in powder form online and simply mix with water to make a solution. I haven't come up with a specific ratio of tannic acid to water – I found that the water will only dissolve a certain amount before the powder just sits at the bottom. For the tea method, stick the kettle on, and brew four or five tea bags in one litre of boiling water for 20-30 minutes. Discard the tea bags, brush the solution onto your wood and let it dry. Your tannic acid solution should also be applied with a brush and left to dry. You will need to experiment with both to ensure you achieve the colour you are looking for.

The first coat you apply using the acetic acid method will change timbers like oak almost immediately, but the colour will have a blue tint to it. The more you apply,



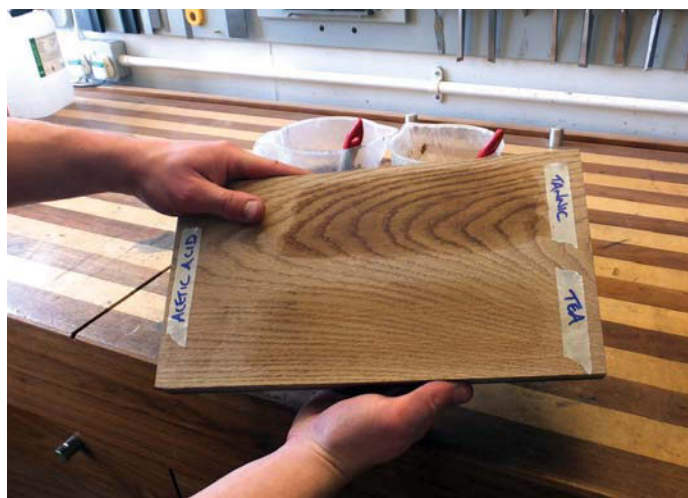
The wire wool was sprayed with water and left outside to rust

the blacker it will go. A couple of things to bear in mind, however, are that boards from different trees will react differently, as will

veneer – always test your methods on a test piece from the same batch you intend to make your furniture from!



Brush on the tea and tannic acid solution. Remember to label your samples



Once dry, it is ready for the acetic acid, I have left a space at the end of the board to compare with acetic acid on its own



Dilute the acetic acid down with water to 20%



The acetic acid will change the wood instantly



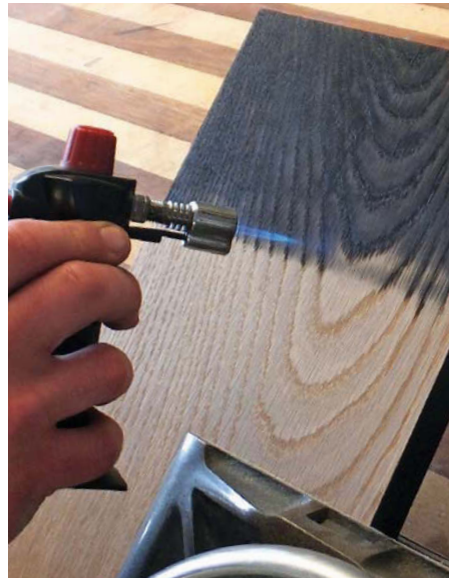
Once dry, you can see the acetic acid has a bluish tint



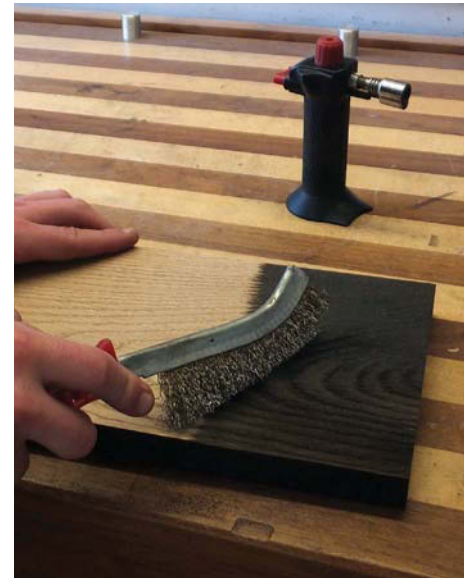
After a few coats, the wood will start to go black

Scorching

Scorching is perhaps the most fun method of ebonising. Who doesn't enjoy taking a blowtorch to a piece of wood? But there is some skill involved as to whether you achieve a finish that is black or just chargrilled. At 'Robinson House Studio', we use a small blowtorch intended for chefs making crème brûlée. The trick is to not let the timber get too hot and to take your time. Work your way slowly around, ensuring that the timber doesn't catch a flame. This way of ebonising works very well if you are after a textured grain effect. After scorching, you can use a wire brush to remove any excess, but the secret in getting the colour is to apply the aforementioned acetic acid approach after scorching. I have found that after brushing, the timber becomes a more consistent colour but is dark brown rather than black. The acetic acid will darken the whole piece as well as colour any deep grain that the blowtorch can't reach.



Carefully work your way across the timber with a small blowtorch



A brass wire brush is great for getting rid of excess and creating a texture

Our shared secret black finish

As mentioned earlier, our senior craftsman came up with an idea that we haven't seen used in ebonising before. The suggestion was that we try using squid ink as a wood stain. Upon further research, Marc discovered that squid ink has a slightly purple tint; cuttlefish ink has a black/brown-like colour and octopus ink is blacker than the night. Unfortunately, octopus ink is not available to buy so we bought cuttlefish ink online, usually used in cooking. It comes mixed with a thickening agent so we mixed it with water and experimented with various ratios. I found that half and half was working for us and anything less gave a dark brown colour rather than black. I applied it with a brush and buffed with a dry rag after it had dried. What we discovered was a natural, deep black finish that was exactly what we had been searching for. Our students are a little fed up with the smell, but that goes away after a few days. *F&C*



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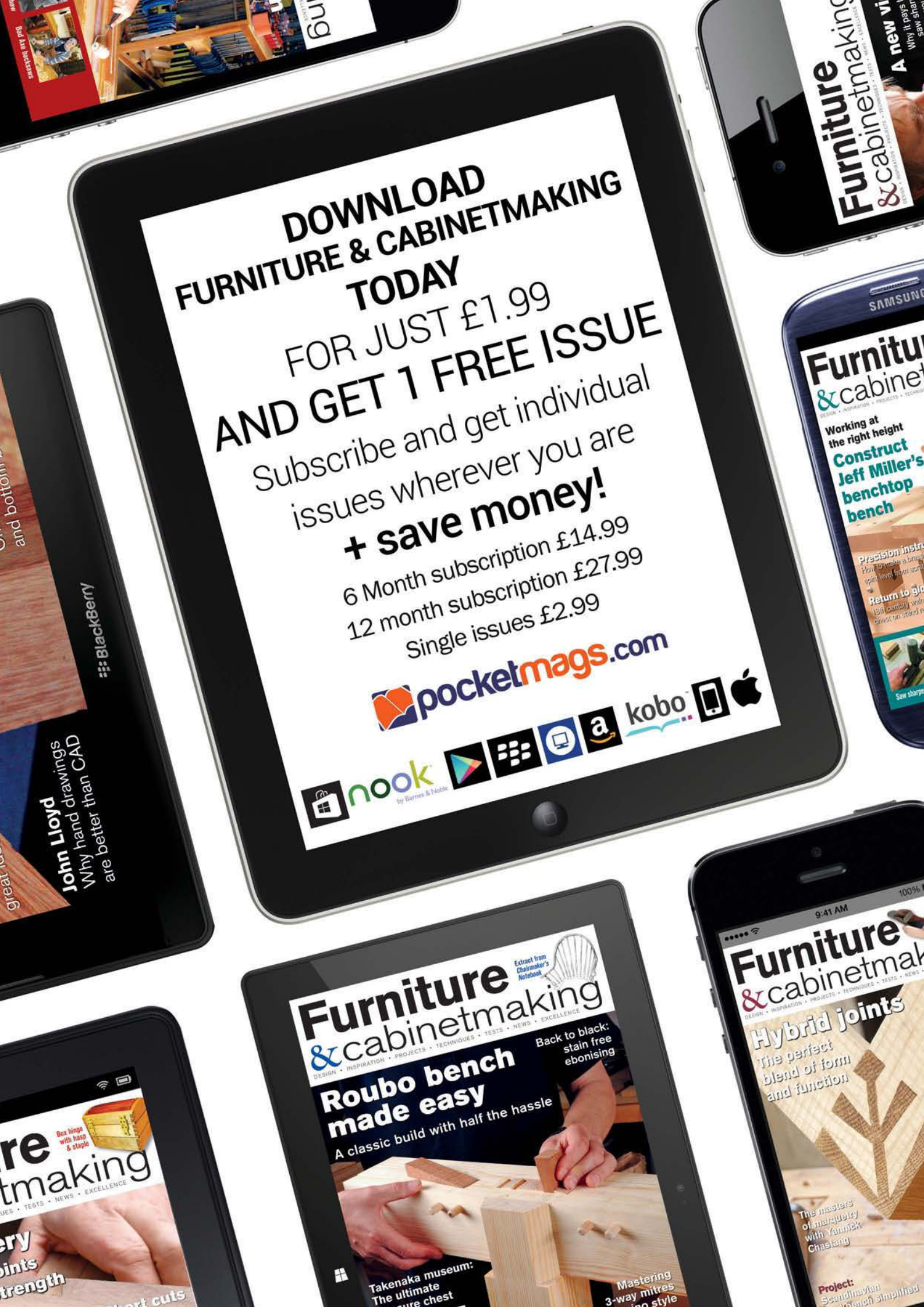
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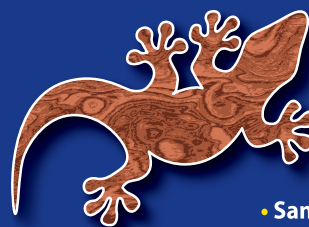
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UNDER THE HAMMER:

Fine 19th-century Chinese cabinet on stand

A fantastic lot from Bonhams' recent Collector's Cabinet auction



LEFT: Lot 1190, a fine 19th-century Chinese export parcel ebonised lacquered cabinet on stand

BELOW: Closed view of the cabinet, showing exterior detailing

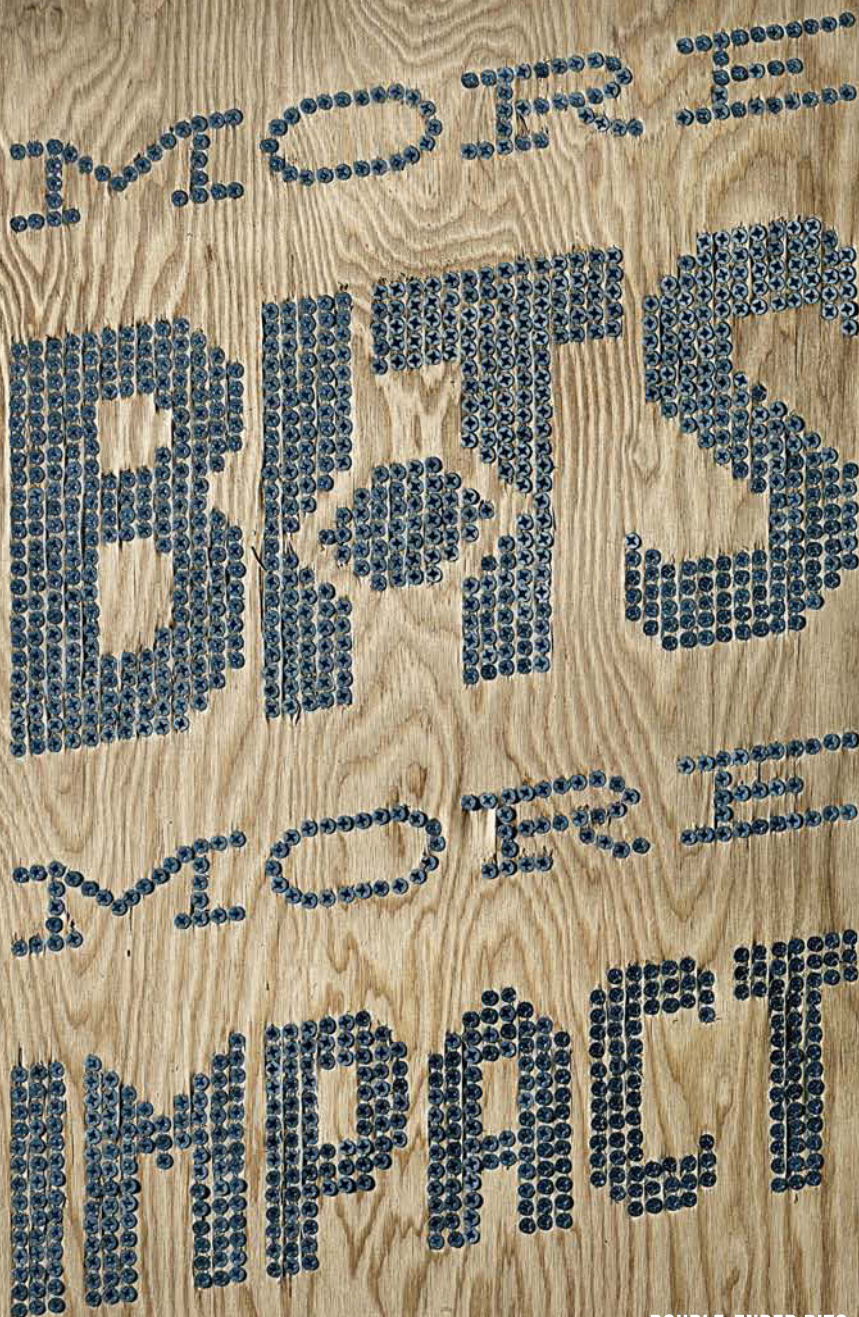


This lot recently went under the hammer as part of Bonhams' recent auction: The Collector's Cabinet: European Furniture and Decorative Arts, which took place in San Francisco. More than 500 curated objects of desire were included in this sale, making it one of the most diverse, interesting and enticing Collector's Cabinets to come on the market. Everything from the Napoleonic era to the Renaissance to the glory of the Belle Epoque was featured.

One of the most anticipated lots was this stunning piece, which is a wonderful example of 19th-century Chinese export furniture and

features an upper cabinet with an outset cornice above two doors, which open to interior glass doors and scalloped shelves. The lower cabinet has two drawers, which open to an interior fitted with eight drawers ending in a geometric banded base. The whole piece is gilt decorated with dense floral vines surrounding panels depicting pleasure boats floating near lakeside pavilions. In contrast, the interior doors are decorated with spare brush strokes and portray birds perched on bamboo.

For more information on this and other lots in the sale, see www.bonhams.com. **F&C**



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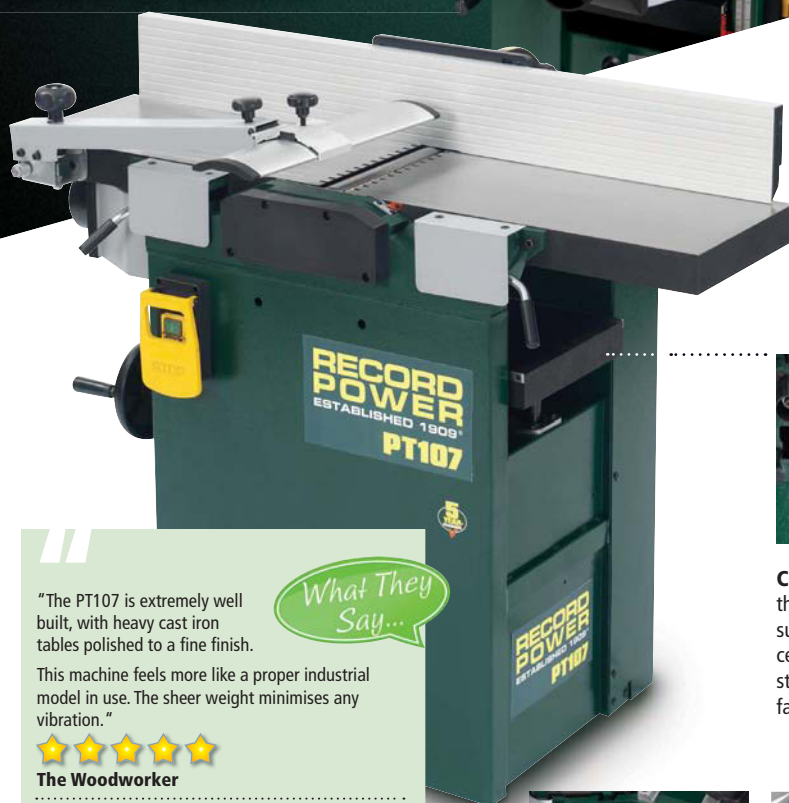
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